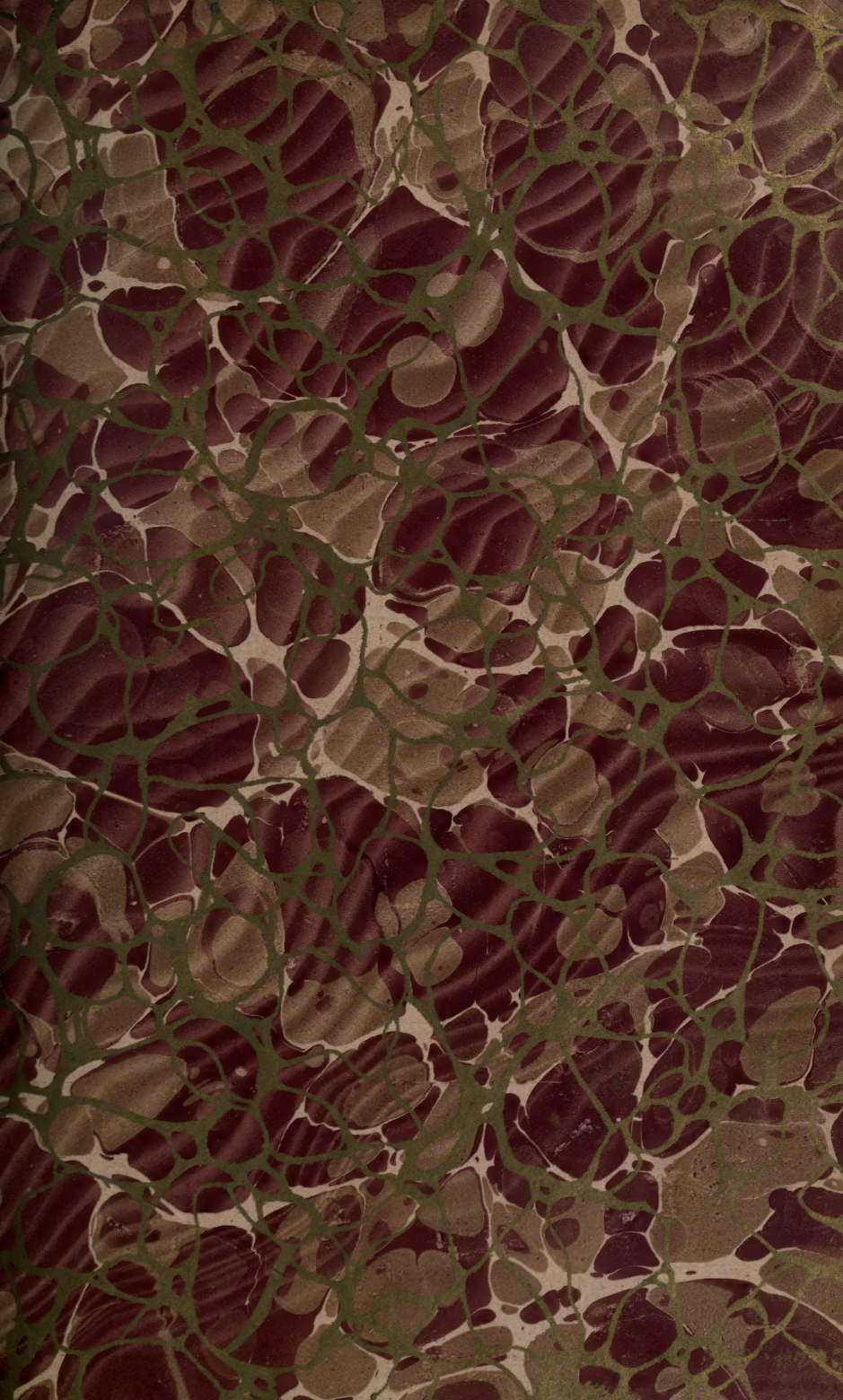






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Proceedings
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Mining and Metallurgical Society
of America



VOLUME V

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Mining and Metallurgical Society *of America*



Bulletin No. Forty-four
January 31, 1912
Vol. V, No. i

Published at the Office of the Secretary
505 Pearl St., New York.

OFFICERS FOR 1912.

President, J. PARKE CHANNING, 42 Broadway, New York.

Vice-President, J. R. FINLAY, 52 William St., New York.

Secretary, {
Treasurer, { W. R. INGALLS, 505 Pearl St., New York.

Executive Committee: Messrs. H. M. Chance, J. Parke Channing, J. R. Finlay, W. R. Ingalls and H. S. Munroe.

COUNCIL.

At large, ex-officio.

J. Parke Channing, 42 Broadway, New York.....Retires January, 1913

J. R. Finlay, 52 William St., New York.....Retires January, 1913

W. R. Ingalls, 505 Pearl St., New York.....Retires January, 1913

Districts 1-2-3.—New York and New England.

H. S. Munroe, Columbia University.....Retires January, 1913

T. H. Leggett, 25 Broad St.....Retires January, 1914

J. F. Kemp, Columbia University.....Retires January, 1915

Districts 4-5.—New Jersey, Pennsylvania, West Virginia, Ohio and Maryland.

H. M. Chance, Philadelphia.....Retires January, 1913

F. Lynwood Garrison, Philadelphia.....Retires January, 1915

District 6.—District of Columbia and Southern States.

Waldemar Lindgren, Washington.....Retires January, 1914

District 7.—Michigan, Minnesota, Wisconsin, Illinois, Iowa and Missouri.

H. V. Winchell, Minneapolis.....Retires January, 1914

District 8.—Colorado, Utah and Nevada.

Philip Argall, Denver.....Retires January, 1915

Districts 9-10.—Oregon, Alaska and California, except Los Angeles, Santa Barbara and Pasadena.

H. F. Bain, San Francisco.....Retires January, 1914

F. W. Bradley, San Francisco.....Retires January, 1915

District 11.—Arizona, Mexico, Texas, Oklahoma and those places in California not included in districts 9-10.

S. W. Mudd, Los Angeles.....Retires January, 1913

District 12.—Montana, Idaho, Washington and Canada.

C. W. Goodale, Butte.....Retires January, 1913

OFFICERS OF SECTIONS.

SAN FRANCISCO.

S. B. Christy,
Chairman.

H. F. Bain,
Secretary,

NEW YORK.

Geo. C. Stone,
Chairman.

F. G. Spisbury,
Vice-Chairman.

Louis D. Huntoon,
Secretary.

PHILADELPHIA.

R. H. Sanders,
Chairman.

F. Lynwood Garrison,
Secretary.

Mining and Metallurgical Society of America

Vol. V

January 31, 1912.

No. 1

ANNOUNCEMENTS.

Ballot of Dec. 8, 1911.—For the counting of the ballots issued under date of Dec. 8, 1911, F. W. Parsons and J. T. Beard were appointed as tellers. They counted the ballots on Jan. 8, 1912, in conformity with the provisions of the by-laws and reported as follows:

J. PARKE CHANNING,
President.

Sir:

We beg to inform you that we have this day canvassed the ballot of Dec. 8, 1911. The Secretary of the Society delivered to us a checked list of members showing a total of 229, of whom 218 were eligible to vote, and together therewith delivered 107 ballots received from members eligible to vote, which ballots had been carefully checked off on the list of members.

Of the 107 ballots delivered two were rejected because of absence of signature. The canvass of the remaining 105 ballots was as follows:

Question 1.—The Memorial to the President of the United States. Shall this memorial be adopted by the Society? There were 96 votes in the affirmative and 9 votes in the negative.

Question 2.—U. S. Bureau of Mines. Shall the bill drafted by the council be adopted by the Society? There were 97 votes in the affirmative and 7 in the negative, one vote being rejected as imperfect.

Question 3.—The Alaska Coal Lands. Shall the resolutions adopted by the council be adopted by the Society? There were 87 votes in the affirmative and 15 in the negative. Two ballots were rejected as imperfect and one member failed to vote on this question.

The above report is respectfully submitted.

FLOYD W. PARSONS,
J. T. BEARD,

Tellers.

Jan. 8, 1912.

MINING AND METALLURGICAL SOCIETY OF AMERICA

The first question was upon the adoption of the following memorial to the President of the United States:

The President,

Sir:—The Mining and Metallurgical Society of America respectfully calls your attention to the importance of carefully considering the mining industry in its relations with the Federal courts. It is a fact known to all persons connected with this industry that the provisions of the mining law at the time of its passage were few and apparently simple, but with the advance in the knowledge of ore deposits it was found that these apparently simple provisions failed to cover many occurrences, and it has devolved repeatedly upon the court of last resort to interpret the fundamental law, with the result that the legal provisions governing mining titles and rights are today in major portion those that have been established by judicial decisions.

Few matters of greater importance, either in their financial aspect or in their bearing upon the welfare of large communities, come before the courts of the United States.

It is the request and hope of the Mining and Metallurgical Society of America that jurists of distinction and noted ability and experience in this and associated industries will receive the favorable consideration of yourself in connection with the filling of the vacancy which now exists.

The majority of the votes cast having been in favor of the foregoing memorial, I declare it to have been carried and to be the formal action of the Society.

The second question was upon the adoption of the following draft for an Act to establish in the Department of the Interior a bureau of mines:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby established in the Department of the Interior a bureau to be called the Bureau of Mines, and a director of said bureau, who shall be thoroughly equipped for the duties of said office by technical education and experience and who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall receive a salary of Six Thousand Dollars (\$6,000) per annum; and there shall also be in the said bureau such experts and other employees to be appointed by the Secretary of the Interior, on the recommendation of the director of said bureau, as may be required to carry out the purposes of this Act, in accordance with the appropriations made from time to time by Congress for such purposes.

Sec. 2. It shall be the province and duty of the Bureau of Mines, under the direction of the Secretary of the Interior, to conduct inquiries and scientific and technologic investigations concerning the mining, extraction, preparation, treatment and utilization of the mineral substances (including petroleum and allied substances) of the United States and its possessions, with a view to increasing the safety and preserving the health of persons engaged in mines, quarries and metallurgical works, and with a view to the elucidation of the conditions existing in the mining, quarrying and metallurgical industries; and concerning the explosives, fuels and other mineral and metal products belonging to or for the use of the government of the United States, with a view to their most efficient use; and to disseminate the information resulting from these inquiries and investigations, or from other sources, together with appropriate recommendations, in such manner as will best carry out the purposes of this Act.

MINING AND METALLURGICAL SOCIETY OF AMERICA

Sec. 3. The director of said bureau, with the approval of the Secretary of the Interior, shall prepare, publish and distribute, under the appropriations made from time to time by Congress, reports of the inquiries and investigations with appropriate recommendations of the bureau concerning the nature, causes and prevention of accidents, and the improvement of conditions, methods and equipment, with special reference to health, safety and prevention of waste in the mining, quarrying and metallurgical industries; the use of explosives and electricity, safety methods and appliances, and rescue and first-aid work in said industries; the causes and prevention of mine fires; and other subjects included under the provisions of this Act.

Sec. 4. Nothing in this Act shall be construed as in any way granting to any officer or employee of the Bureau of Mines any right or authority in connection with the inspection or supervision of mines or metallurgical plants in any State; nor as granting to the Bureau of Mines any right or authority to undertake any investigation or operation in behalf of any individual person, partnership, corporation or association except for the health and safety of persons employed in the mining, quarrying and metallurgical industries.

Sec. 5. No person who is regularly employed by the Bureau of Mines shall be permitted to undertake special engagements, or accept employment for compensation, from any person, association of persons, or corporation; nor shall the Bureau of Mines detail any such regular employee to perform such service, except as above stated. Provided that this prohibition shall not be construed to apply to such engineers or experts as may be connected with the said bureau in a consulting capacity, or in the investigation of any special matter, and whose principal professional practice is outside of such employment by the bureau.

The majority of the votes cast having been in favor of the foregoing draft, I declare it to have been carried and to be the formal action of the Mining and Metallurgical Society of America.

The third question was upon the adoption of the following resolutions respecting the Alaska coal land question:

1. It is essential for the proper development of Alaska that its coal fields be opened for commercial use without further delay.

2. There are now known to exist but two relatively small fields containing high-grade naval fuel, and inasmuch as the government now possesses no original source of such supply on the Pacific coast it is desirable in the interests of national defense that a selected area of these fields be held and operated under the direct control of the government.

3. All rights which have accrued legally under statutes heretofore existing should be recognized.

4. If it be decided by the Congress that it is to the best interests of public welfare that coals lands in Alaska be leased, we recommend that the following conditions should be embodied in the leases:

a. These leases should be made for all the coal in the ground.

b. The royalty should be low and based on percentage of selling price of the coal at the mines.

c. The minimum annual production upon which royalty is to be paid should be nominal for the first two or three years after the execution of the lease in order to permit and encourage the installation of efficient and durable equipment. After that period the minimum production upon which royalty should be paid should increase more rapidly than the area increases. For

example: the minimum production upon which royalty should be paid on a tract of 5,000 acres should be several times more per acre than for 1,000 acres. Such a plan would prevent the tying up of large areas of undeveloped coal territory.

d. A due-diligence and forfeiture clause to effect continuous work should be included in the lease.

e. Leasehold in coal lands should include all necessary timber, mining and surface rights.

f. Leases should not be given for less than 40 acres and in shape should be rectangular, their boundaries being east and west and north and south, and after the system of public surveys has been extended to Alaska and the land applied for is in a surveyed township, the unit areas of a lease should be those established by the government survey as subdivisions of the sections.

g. The length of the tract of land embraced within a single lease should not be more than three times as great as its width.

5. It should be clearly recognized as a basic principle that the value to the nation of coal lands in Alaska lies more in their use for industrial, commercial and naval purposes than in the royalties to be derived therefrom, and it is desirable that the revenue obtained from coal royalties inure to the benefit of the territory.

The majority of the votes cast having been in favor of the foregoing resolutions, I declare them to have been carried and to be the formal action of the Mining and Metallurgical Society of America.

J. PARKE CHANNING,
President.

Jan. 8, 1912.

The memorial to the President of the United States was formally transmitted to him on Jan. 8. Copies of the draft for an Act respecting the Bureau of Mines were forwarded to the Hon. Martin D. Foster, chairman of the Committee on Mines and Mining of the House of Representatives and to Dr. Joseph A. Holmes, Director of the U. S. Bureau of Mines. Copies of the resolutions respecting the Alaska coal land question were forwarded to the Hon. Walter L. Fisher, Secretary of the Interior, and to the Hon. Martin D. Foster.

Committees.—The President has appointed the following committee on Standardization: C. R. Corning, chairman, Robert Peele and Hennen Jennings. The other committees of the Society as finally constituted are as follows: Professional training, A. L. Walker (chairman), S. B. Christy and F. W. Bradley. Professional ethics, B. B. Lawrence (chairman), F. L. Garrison and S. W. Mudd. Mining law, H. V. Winchell (chairman), C. W. Goodale and M. L. Requa. Annual medal, H. S. Munroe (chairman), J. F. Kemp and A. L. Walker.

Badge.—The badge of the Society, officially adopted by the Council, may be obtained from the Secretary at a cost of \$5 when made in gold, silver and blue enamel; \$20 when made in gold, platinum and blue enamel. The badge may be obtained either as a pin or as a watch-charm. In ordering, be particular to state which form is wanted.

Bound Volumes.—Bound volumes of the bulletin of the Society for 1911 may be obtained from the Secretary for the price of \$1.50. Any member desiring a complete set of the bulletins for 1911 unbound can obtain it, free of charge, by application to the Secretary.

W. R. INGALLS,
Secretary.

COUNCIL.

A meeting of the council was held at the office of the President, 42 Broadway, New York, Tuesday, Jan. 23, at 4 p. m. The councillors present were Messrs. Channing, Chance, Finlay, Garrison, Ingalls, Kemp and Munroe, total number, 7, this constituting a quorum.

In accordance with the provisions of the by-laws, lots were drawn for time of service by members of the council. The result of this drawing of lots, conducted by the President, was that Messrs. Mudd, Chance, Munroe and Goodale are to retire in January, 1913; Messrs. Bain, Lindgren, Leggett and Winchell, in January, 1914; Messrs. Bradley, Garrison, Kemp and Argall, in January, 1915.

Upon motion, duly seconded, an executive committee of the council, with full power was constituted. Messrs. Channing, Finlay, Ingalls, Chance and Munroe were elected members of the executive committee.

W. R. INGALLS,
Secretary.

MINUTES OF ANNUAL MEETING.

The fourth annual meeting of the Mining and Metallurgical Society of America was held at the Engineers' Club, New York, Tuesday, Jan. 9, 1911. The meeting was called to order by J. Parke Channing, president, who first requested the members present to deliver to the Secretary any proxies held by them. The Secretary, after a count of the proxies, reported that 59 members were present by proxy and 22 in person, a total of 81. The President declared this to be a quorum.

The members present in person were the following: Messrs Buck, Chance, Channing, Chauvenet, Conner, Cottrell, DuBois, Griffith, Holmes, Howe, Huntoon, Hutchinson, Ingalls, Lindgren, Loring, Mendenhall, Parker, Sanders, Sharpless, Spilsbury, Stone, and Walker.

The President stated that the first business would be the approval of the minutes of the last previous meeting, that having been held on July 31, 1911. The President stated that the minutes of that meeting had been published in bulletin No. 38, and that if no objection were made he would declare them approved. No objection having been made, the minutes of the meeting of July 31, 1911, as published in bulletin 38, were declared approved.

The President announced the result of the letter-ballot on the memorial to the President of the United States, on the Bureau of Mines bill and on the Alaska Coal Land question, as reported elsewhere in this bulletin. He then delivered the annual presidential address as published elsewhere in this bulletin.

The Secretary read his report for 1911, as published elsewhere in this bulletin. Upon motion, duly seconded, the Secretary's report was accepted and ordered to be placed on file.

The Treasurer presented his report for 1911, as published elsewhere in this bulletin. Upon motion, duly seconded, the report of the Treasurer was approved.

Mr. Sharpless, who was duly seconded, moved that a vote of thanks be made to the Secretary of the Society for his services during 1911. This motion was unanimously carried.

Upon announcement that the meeting was open for the introduction of new business, Mr. Ingalls moved an amendment to by-law No. 9, by introducing into the present by-law the words italicized in the following draft:

"The officers of the Society, as provided in the constitution, shall be elected as hereinafter provided, except that whenever a vacancy occurs it shall be filled by a majority vote of the council. Their respective terms of office shall begin at the close of the meeting at which they are elected. The duties of the several officers shall be such as usually attach to the office, or such as may be determined by the council. *In the absence of the president from the contiguous territory of the United States, his duties shall be performed by the vice-president.* The council may delegate its power to persons or committees, and may make such rules and regulations as may be necessary for the proper conduct of the business of the Society, provided that these are in harmony with the con-

stitution and by-laws, *which rules and regulations shall remain in force until rescinded.*"

This motion, which was duly seconded, resulted in considerable discussion of the phraseology of the proposed amendment, and finally Mr. Ingalls withdrew his motion. Mr. Griffith then moved to amend by-law No. 9 by introducing the following sentence: "In the event of the disability or inaccessibility of the president his duties shall be performed by the vice-president." This motion was seconded. After further discussion, Dr. Holmes, who was seconded, moved to lay the matter on the table. Upon vote this motion was lost. The chairman then put Mr. Griffith's motion, which also was lost.

The tellers, Messrs. George C. Stone and L. D. Huntoon, previously appointed by the president to count the vote for officers of the Society for 1912 then announced that they were ready to report. They reported that the Secretary had delivered to them the sealed ballots in conformity with the provisions of the by-laws, together with properly checked list of the members. The number of members eligible to vote was 218. The number of valid ballots received was 155. For President, J. Parke Channing, received 95 votes, and no other candidate so many; for Vice-President, J. R. Finlay, received 69 votes, and no other candidate so many; for Secretary and Treasurer, W. R. Ingalls received 136 votes, and no other candidate so many; for councillors from districts 1-2-3, J. F. Kemp received 80 votes; J. Parke Channing, 52 votes; J. R. Finlay, 44 votes; H. S. Munroe, 43 votes; T. H. Leggett, 42 votes, and no other candidate so many; for councillors from districts 4-5, H. M. Chance, 95 votes, and F. L. Garrison, 57 votes, and no other candidate so many; for councillors from district 6, Waldemar Lindgren, 66 votes, and no other candidate so many; from district 7, H. V. Winchell, 85 votes, no other candidate so many; from district 8, Philip Argall, 66 votes, and no other candidate so many; from districts 9-10, H. F. Bain, 87 votes, and F. W. Bradley, 61 votes, and no other candidate so many; from district 11, S. W. Mudd, 73 votes, and no other candidate so many; from district 12, C. W. Goodale, 53 votes, and no other candidate so many.

The President ruled that in the case of the vote for councillors from districts 1-2-3, the vote for Messrs. Channing and Finlay should be excluded, they having already been elected councillors ex-officio. The President then declared the result of the ballot to be the election of J. Parke Channing as President, J. R. Finlay as Vice-President, W. R. Ingalls as Secretary and Treasurer, and J. F. Kemp, H. S. Munroe, T. H. Leggett, H.

M. Chance, F. L. Garrison, Waldemar Lindgren, H. V. Winchell, Philip Argall, H. F. Bain, F. W. Bradley, S. W. Mudd and C. W. Goodale as councillors from the respective districts.

Upon motion, duly seconded, a vote of thanks to the tellers was passed.

There being no further business, the meeting was then adjourned.

The annual dinner of the Society was held at the Engineers' Club, beginning at 6:30 p.m., Jan. 9. The members present were the following: S. M. Buck, H. M. Chance, J. P. Channing, S. H. Chauvenet, E. T. Conner, F. G. Cottrell, H. W. Du Bois, William Griffith, F. Hellmann, J. A. Holmes, E. S. Hutchinson, W. R. Ingalls, Hennen Jennings, S. J. Jennings, T. H. Leggett, W. Lindgren, F. C. Loring, W. W. Mein, J. W. Mercer, R. Van A. Norris, F. W. Parsons, E. W. Parker, G. S. Rice, A. H. Rogers, F. F. Sharpless, E. G. Spilsbury, R. H. Sanders, G. C. Stone, S. F. Shaw, O. Sussman, A. Thacher, A. R. Townsend, A. L. Walker and L. A. Wright. Messrs. A. S. Dwight and W. J. Sharwood were present as guests.

After dinner there were speeches by several of the members present.

Mr. Channing introduced the program with some appropriate words and called on Mr. Leggett.

Mr. Leggett, after a few remarks on the subject of the "Scientist Underground," brought to the attention of the Society the new screenless sizer invented by Messrs. Rice and McKesson, who now have a machine in operation at the works of Henry Wood in Denver, Colorado. Mr. James M. McClave of that city has recently read a paper before the Scientific Society of Denver, describing this sizer, and the remarkable results that are being achieved by it.

J. Parke Channing.—Mr. Leggett's speech on scientists underground was very interesting and brings to mind one of my experiences on the Gogebic range nearly 25 years ago, when the study of the genesis of ore deposits was in its infancy. This range is an extremely simple one, in which the series are unfolded and dip gently to the north at an angle of some 60 deg., the outcrop being traceable for 70 miles. The iron formation is cut by dikes dipping to the south at an angle of 30 deg. and with a pitch or rake to the east. These dikes, where they cut the quartzite foot-walls, make troughs in which the hematite is concentrated by a secondary process. The occurrence of the ore deposits had been worked out by the Roland Duer Irving

in connection with Charles R. Van Hise, now President of the University of Wisconsin, and I had the pleasure of doing a large portion of the underground work for them.

I was full of youthful enthusiasm on the subject and one day was going through the Colby mine with a party of visitors, which was being led by a Cornish mining captain. I have no doubt that my description of the formation was rather too much for him and he felt that he was being relegated to the back-ground. During a rest in the trip he said to me: "Mister Shannon, wheer did you learn all that to."

I said, "Captain, some of it is the result of my own observation, and some of it is information that has been published in a monograph of the United States Geological Survey."

"Monograph, what do'ee call a monograph?"

"A monograph," said I, "is a book."

"A book," said he, "how big is that book?"

I replied that it was about twelve inches high, eight inches wide, and about an inch thick.

"Huh," said he, "I've got a book at 'ome and its three feet 'igh, two feet wide and six inches thick, and damme it ain't in theer."

Mr. Mercer no doubt remembers this old Cornish mine captain with his long red beard, who I fear is now gathered to his fathers. Still, however, the theory of the deposits of the Gogebic range as outlined by Irving and Van Hise has not been upset and has done much toward clarifying the theory of ore deposition.

Mr. Mercer replied to Mr. Channing's references, and then described a journey on foot that he made during the last autumn, starting from the Pacific coast, crossing the Canadian Rockies, passing through over the plains of the Northwest, and finishing at Edmonton.

Arthur L. Walker next made some remarks on basic copper converting, saying:

Ever since the Manhès process for bessemerizing copper matte was first introduced at the Parrot smelter in 1884, copper metallurgists have been troubled with the great difficulty of providing a satisfactory converter lining. A lining was necessary to protect the shell, and as the material treated contained nothing but bases, an acid lining was deemed absolutely essential. This lining was soon attacked and eaten away by the bases and by the action in the charge of the converter.

Experiments in using water-jacketed converters were unsuccessful on account of chilling and difficulty in fluxing the matte. The first experiment made with basic-lined converters

was also unsuccessful, as the brick lining did not last under the severe service imposed upon it, especially around the tuyeres, and until the last few years no entirely satisfactory method of lining converters has been available.

About 1905 a revolving reverberatory furnace was installed at Baltimore by Messrs. Peirce and Smith for the purpose of treating certain low-grade matte and silicious ore. The furnace was about 10 ft. in diameter and 25 ft. long, having an outside firebox at one end and a flue connection at the other end. The original feature of this furnace was a row of tuyeres at the back similar to those used in a regular copper converter. There was a charging opening on top and a slag and metal tap in front. In operating the furnace it was expected to obtain sufficient heat to smelt the charge of low-grade matte and silicious ore by the combined use of the fire-box and the combustion of the sulphur in the matte by blowing air through the molten mass. After matte and ore had been charged several times and slag poured off at proper intervals, the condition of the material was brought to white metal, and then by the use of blast only the charge was brought to blister copper. Of course as the matte treated was basic the reverberatory furnace was lined with basic brick.

It was soon found that extraneous heat was not necessary and the fire-box was cut off. The flue connection at the other end was then also cut off, and the gases taken from the charging opening at the top. The result was a large, horizontal, revolving basic-lined converter, pure and simple.

This basic converter has been so perfected mechanically that its development has been rapid in an extraordinary degree. In fact at the present time over 80 per cent. of the output of converter copper in this country is treated in the Peirce-Smith converters, or in the former acid-lined converter shells in which the acid lining has been replaced by basic lining. In these cases the converters are operated under license granted by the Pierce-Smith Converter Company.

A full description of the operation and advantages of the large basic converters was then given.

D. M. Riordan described some early experiences in Arizona

The meeting was then adjourned.

W. R. INGALLS,
Secretary.

PRESIDENTIAL ADDRESS.

In organizing the Mining and Metallurgical Society, its charter members had four main purposes in view: First, to create a strictly professional society in which membership would have a meaning and a value; second, to promote social intercourse among its members; third, to discuss matters of purely professional interest, and, if useful, to express the opinion of a professional body about them; and fourth, to discuss and perhaps act upon questions of public interest coming properly within the purview of the mining and metallurgical professions.

The first of these objects was easily attained. A glance at the list of members is convincing as to their professional character. The second was less easy. In aiming toward it, and at the same time toward the other purposes, local sections were organized with the idea that they would hold frequent meetings and thus bring the members of the Society together. Three sections have thus been organized and in so far the second purpose of the Society has been accomplished. The meetings have gradually become better and better attended simply because members have found them both enjoyable and profitable. The failure of the Society in this particular, if it be a failure at all, is in the inability of a majority of the members to participate in these meetings; this is inevitable because the places where enough members can conveniently meet are few in number. However, as the Society increases in membership the number of local sections will doubtless increase; members visiting New York, Philadelphia and San Francisco have taken advantage of opportunities to attend local meetings and thus have directly taken part in the proceedings. This opportunity is of course superior to that offered by a society meeting only in one place. Moreover an effort has been made to bring all members of the Society together in discussion through the medium of the monthly bulletin, and it is hoped that there will be more general discussion in that way.

With respect to the third and fourth purposes of the Society but little has apparently been accomplished, and this has perhaps given rise to some doubts as to their feasibility. The actions of the Society have been but two, viz., its formulation of opinion as to what the report of a mining company should comprise and the expression of the opinion that State mine inspectors should be appointed, not elected.¹ These actions were important and useful, especially the first. We have all observed an increase in the publicity of our mining companies during the last few years. Many freely tell things

¹This was written before the recent action of the Society on several matters.

today that 10 years ago they would not have dreamed of disclosing. This has been largely, and perhaps chiefly, the result of pressure exerted by the newspapers, but I am satisfied that the action of this Society was materially instrumental in progress in this direction.

But while its formal acts so far have been only two, the Society has given study and discussion to matters of importance that will be fruitful later on. For example, in the matter of the prevention of mine accidents. Our record may not have been spectacular, we have not figured prominently in the public eye, but I feel that we have already done solid work of which we may well be proud.

There have been reasons, however, for our slow procedure toward the third and fourth purposes that I have mentioned. We are in fact engaged in an experiment that I believe to be unique in the history of professional societies; if not unique it is at any rate unusual. When these purposes were outlined, before the organization of the Society, to some persons experienced in the direction of professional or technical societies, they pronounced them impracticable and certain to lead to disaster. Only last October the secretary of a sister society, writing about the meeting of the San Francisco section at which he was present as a guest, when the Alaska coal question was discussed, said, "The wide diversity of opinion expressed showed how impossible it must be, in the nature of the case, to secure a uniform verdict on any such matter, which would correctly represent the views of the society as a whole. While the discussions are certainly profitable and instructive and lend a proper interest to the meetings, yet a final expression of the opinion of the society as a whole could not be arrived at without great difficulty and arousing of bitter antagonisms. Such a practice is a principle of separation, a source of discord which would ultimately disrupt any society trying to put it into practice."

I believe this gentleman, as well as earlier prognosticators of disaster on this ground, to be wrong; but I recognize, and the council of the Society has recognized, the danger in this respect, and for that reason action has been slow and cautious, and even restrictive. Objection to this policy has been made by members of one section, who have desired autonomy, so to speak, but a committee of the council instructed to report upon this matter and revision of the constitution and by-laws generally, reported against any plan that would permit any group of members to use the name of the Society without formal action by the whole Society, or to act publicly as a part of the Society; and the report of this committee, which was

founded upon recognition of the novelty of what this Society is trying to do, and of the Scylla and Charybdis between which we must steer, was emphatically supported by vote of the whole council.

The only practicable way of accomplishing these purposes is by deliberate consideration of every matter brought before the Society, and by action by the whole Society after full opportunity has been given to know what is proposed. By an unfortunate oversight in our original by-laws it was extraordinarily difficult for the Society to take any action at all. Between the introduction of a resolution and its passage or defeat, about eight months had to elapse, and it actually happened in one case that a public matter upon which the Society attempted to express its opinion was settled before the Society was able to act, which rendered much discussion abortive. Since the by-laws have been amended, we have become able to secure reasonably prompt action without undue sacrifice of deliberate consideration, and so far as it has been tried the machinery seems to work. Every member of the Society has been in a position to observe the working in the actions upon the memorial to the President, the Bureau of Mines bill, and the Alaska coal resolutions that have just been taken, and any member can say whether there are parts that need further polishing or any exposed gearings that are dangerous.

Briefly the system of action is based upon the theory that the council of the Society is a representative body, which character is insured by its geographical nomination, and that all local sections, and indeed the entire membership, shall take up the discussion of the same subjects at about the same time. After such discussion, which is reported in the monthly bulletin, some local section may have reached the point of crystallizing its ideas in a resolution. Such a resolution is transmitted to the council, which may put it before the Society as a whole for vote, or may refuse to do so. In the event of refusal, the resolution is returned to the local section of origin with a statement of the reasons for refusal. The local section can then if it chooses reiterate the resolution, in which case the council is bound to submit it to the membership.

This procedure is not limited to organized local sections, there being provision that any seven members not enrolled in a local section may unite temporarily for action in the same way as a section. Also, the council itself may initiate action. After the council has put a question to the Society for vote, at least 30 days must be allowed for the ballot. This affords time for further discussion, both at meetings of local sections and by correspondence. With a membership that is relatively small,

and that probably will always be relatively small, it would not be difficult for any member, who might feel that his arguments respecting some matter had not been adequately presented, to address the entire membership by circular-letter.

It must be frankly admitted that any attempt to secure the action of an organized body of men by any method other than the usual parliamentary one bristles with difficulties. We think, however, that we have designed a method that is reasonable, equitable and effective. Whether it will so prove to be, experience only can show.

The course of my remarks upon the purposes and machinery of the Society brings me naturally to the status of local sections. When the Mining and Metallurgical Society was organized there was a feeling that a weakness of most technical societies was the inability of most of the members to attend its meetings, generally infrequent, and consequently that but little association and but little discussion were possible. It was aimed in our Society to remedy this drawback by arranging for frequent meetings and meetings all over the country, that is, wherever a sufficient number of members could conveniently come together. This developed the idea of local sections for the purpose of meetings, but the meetings were to be always meetings of the Society, fragmentary if you please, but not merely meetings of local clubs. With this idea it was contemplated that all local meetings should take place on the same day. That did not prove to be practicable because of the difference of customs in different parts of the country. Thus Saturday is a bad day for such meetings in New York because so many men are likely to be out of town for the week-end, whereas in another place it might be the best day, for the reason that upon that day out-of-town members have the habit of coming into town. However, it seems to be essential that all local sections should have their meetings at about the same time, say in the same week, for the reason that publication of the monthly bulletin of the Society cannot otherwise be properly conducted; I mean conducted in such a way as promptly to report discussions and put the membership in a position to carry out the third and fourth purposes of the Society; and as I have previously pointed out the successful consummation of those purposes hinges largely on the bulletin, the pages of which are in reality our forum.

A few words more as to carrying out these purposes of the Society. It has been our experience, just as it has been that of every other organized body, that broad measures cannot be properly formulated in a general meeting, no matter how intelligent a body it may be. Subjects must first be carefully studied

by small committees. After each study, which often must be prolonged, ideas may be crystallized and when presented to the whole body then concentrated and profitable discussion may ensue; from such a body as ours will inevitably ensue. The council of the Mining and Metallurgical Society has recognized that the basis of a large part of its public actions must be the work of committees, and a series of committees has been appointed, comprising committees on the Prevention of Mine Accidents, Professional Training, The Mining Law, Professional Ethics, and the Standardization of Technical Practice. The Committee on the Prevention of Mine Accidents, which is also a committee of the U. S. Bureau of Mines, has already made a report and probably will make an amended and final report during 1912. The other committees are only at the beginning of their work. Doubtless the number of these committees will be added to as the members of the Society suggest new subjects that ought to be taken up. This is a great and useful field of work for the Society.

In summing up, however, I must say simply that the success of our Society hangs chiefly upon the interest and co-operation of its membership. It is indeed gratifying that we have already been able to secure it in such a full measure.

J. PARKE CHANNING,
President.

REPORT OF SECRETARY.

The following report for 1911 is respectfully submitted.

Membership.—The membership of the Society experienced a healthy growth during 1911, the net gain for the year having been 42 against a gain of 24 in 1910. Six members were lost during 1911 by death and only one by resignation. The record of the year is summarized in the following table:

Total membership January 1, 1911.....	187
Members elected during 1911.....	49
Died	6
Resigned	1
	— 7
Annual gain	— 42
Total membership, January 1, 1912.....	229
Candidates now before the Council on List No. 26.....	3
Candidates now before the Society on List No. 27.....	2
Applications pending	11

The applications for membership received during 1911 were carefully scrutinized by the executive committee of the council, and after submission of the reports of applicants passed by the executive committee to the entire membership of the

Society for consideration, the names went before the council for letter-ballot, in conformity with the amended by-law governing election of members. It is considered that the character of the Society has been fully maintained by the additions to its membership during 1911. As a result of the careful scrutiny by the executive committee no applicant for membership whose name was submitted to the council was rejected on letter-ballot.

The members of the Society who died during 1911 were: Robert Forrester, Charles F. Shelby, S. F. Emmons, Heber S. Thompson, Linton B. Sutton and Alfred J. Bettles. In their deaths the Society suffered sad loss. An obituary notice in each case was published in the bulletin of the Society.

Meetings of Sections.—The New York section held 10 meetings, the Philadelphia section 6 meetings, and the San Francisco section 6 meetings during 1911. There were also 4 general meetings of the Society. We had, therefore a total of 26 meetings during the year. The general meetings of the Society were devoted to business. At the meetings of the sections the main subjects of discussion were mine accidents, professional ethics, the Alaska coal lands, representation of the mining industry in the Supreme Court of the United States and the functions of the U. S. Bureau of Mines. These subjects were discussed by all the sections, except that the San Francisco section did not take up professional ethics. At one of the meetings of the New York section there was a discussion of the measures proposed by certain persons to compel the licensing of engineers, and one meeting of the New York section was devoted to a discussion of purely technical matters.

Amendments to Constitution and By-Laws.—It having been discovered that action by the Society upon any matter was an extraordinarily tedious procedure, tending for this reason to defeat the purpose of the Society, the executive committee of the council was instructed early in 1911 to prepare amendments to the by-laws simplifying procedure; and also to prepare such other amendments to the constitution and by-laws as seemed to be advisable. Acting under these instructions the executive committee submitted such amendments, which in the main enabled the Society to take a prompt and conclusive vote upon any subject, except amendments to the constitution; and changed the method of electing officers from the old one of election by the council to election by the entire membership. The proposed amendments were adopted by the council, and with a few minor alterations were unanimously adopted by the Society, on letter-ballot. The executive committee also sub-

mitted to the council amended rules and regulations governing local sections and governing resolutions, the latter providing a system for action upon matters of interest to the Society under the amended by-laws. These new rules and regulations were acted upon by the council, by letter-ballot, and were adopted by a large majority.

Committees.—Realizing that the work of the Society in matters of professional and public interest must to a large extent be based upon preliminary study by committees, the council during 1911 authorized committees upon the following subjects, each committee consisting of three members: Professional training; professional ethics; mining law; and standardization. With the exception of the last, the President of the Society appointed these committees, which have already begun study of the respective questions. The committee on the prevention of mine accidents, which was a joint committee of the Mining and Metallurgical Society, American Institute of Mining Engineers and the American Mining Congress was during 1911 appointed an official committee of the U. S. Bureau of Mines whereby the necessary assistance was put at its disposal. This committee is expected to make a further report in 1912, which report will eventually come before the Mining and Metallurgical Society for consideration.

M. M. S. A. and A. I. M. E.—At a meeting of the council of the Mining and Metallurgical Society on June 15, 1911, the following resolution was adopted: "That it is the sense of this council meeting that the council of the M. M. S. A. is ready to receive through its executive committee suggestions from the council of the A. I. M. E. looking toward affiliation of the two societies." The council of the A. I. M. E. having appointed a conference committee of five members, a joint meeting of this committee and the executive committee of the M. M. S. A. was held at the Engineers' Club, July 11. Following an extended discussion, a resolution was unanimously adopted to the effect that some plan of affiliation of the two societies is desirable, each society to preserve its identity and organization. By a further resolution, the presidents and secretaries of the two societies were appointed a sub-committee to develop a plan on the above line to be submitted to the respective societies. At a meeting of this sub-committee it was recommended to the councils of the respective societies that arrangements be made for joint meetings of the local sections of the two societies whenever possible and that joint meetings of the local sections of the two societies be authorized and advised. Since then no further steps have been taken in this matter.

Bulletin.—The monthly bulletin of the Society was published regularly during 1911, and in general was published promptly at about the first of each month. The bulletin is printed under contract on terms that are reasonable. Arrangements have been made to ensure more promptness in publication during 1912. It is now planned to publish the bulletin on the last day of each month. This implies that all matter intended for any issue must be in the hands of the Secretary not later than the 20th of the month.

Letter-Ballots.—During 1911 three ballots by the entire membership of the Society were conducted. These took place, under the provisions of the by-laws and rules, which proved to be adequate and equitable for the purpose intended. Experience in the handling of these letter-ballots inspires me to give the following advice to members of the Society:

Don't return a voting envelope without signature in the designated place. Unsigned envelopes are not delivered to the tellers for count. Thus the unidentified ballot is not counted.

Don't fail to enclose ballots in the special accompanying envelope. The marks made upon the latter are to enable them when returned to be put in the proper box. It often happens that ballots on different matters are being returned at the same time, wherefore the distinguishing marks that are made by the Secretary.

Don't enclose in a voting envelope anything but the ballot. These envelopes are not opened until the specified date, which may be 30 days after mailing, wherefore a communication to the Secretary enclosed in such an envelope cannot possibly receive attention until it has been discovered and delivered by the tellers counting the ballots.

Don't vote with qualifications when a "Yes" or "No" vote has been ordered by the council. A vote rendered in any other way is not counted.

Don't fail to exercise your right to vote.

Formal Actions.—The membership of the Society, on letter-ballot, decided that the Society should award annually under rules to be subsequently formulated by the council, a gold medal valued at \$100 to the person who, in the opinion of the Society, has done most during the previous year to advance the arts of mining and metallurgical engineering, said medal to be awarded without regard to membership in the Society. A committee to formulate rules for the award of this medal was authorized by the council and has been appointed by the President.

Actions of public interest that were taken by the Society consisted of the expression of opinion that state mine inspect-

ors should be appointed, not elected; the adoption of a memorial to the President of the United States requesting him to appoint in the Supreme Court a judge of experience in the mining industry; resolutions expressing the opinion of the Society in respect to proposed leasing of Alaska coal lands; and the formulation of a new organic law for the U. S. Bureau of Mines. In all of these cases the opinion of the Society was expressed by a decisive vote, on letter-ballot.

Conclusion.—The Society finishes the fourth year of its existence with a healthy growth in membership, an important increase in prestige, and what appears to be well developed machinery for the conduction of its affairs.

W. R. INGALLS,
Secretary.

REPORT OF TREASURER.

The following report for 1911 is respectfully submitted:

RECEIPTS.

Cash on hand, January 1, 1911.....	\$1,381.78
Received for annual dues, 1909.....	10.00
Received for annual dues 1910.....	60.00
Received for annual dues, 1911.....	2,235.00
Received for annual dues, 1912.....	10.00
Received from Philadelphia section in settlement of account	1.33
All other receipts*.....	157.97
	<hr/>
	\$3,856.08

*Includes overpayment of dues, \$10; exchange, \$0.51; expressage, \$0.25; life membership, \$50; for annual dinner, \$57.80; cash due W. R. Ingalls, \$4.91; amount due for stationery sold from stock, \$2; for bound volumes, \$22.50; badges, \$10.

EXPENDITURES.

Printing Bulletins, lists, etc.....	\$ 758.73
Salaries of assistants to secretary-treasurer.....	304.00
Stenography and typewriting.....	596.96
Postage, telegraphing and expressage.....	136.41
Stationery and office supplies.....	97.80
Bills paid for section aid*.....	72.64
Bank exchange	5.51
All other expenditures**.....	139.62
Cash in bank	1,741.86
Petty cash	2.55
	<hr/>
	\$3,856.08

*Cash paid to Philadelphia section, \$3.50; to New York section, \$26.67; to San Francisco section, \$42.47.

**Includes annual dinner and rent of room for annual meeting, \$74.50; amount due W. R. Ingalls, \$4.91; incorporation, \$14.46; designing emblem, \$7; binding bulletins, \$28.75; refund of overpaid dues, \$10.

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The assets and liabilities on Jan. 1, 1912, were as follows:

ASSETS.

Cash in bank, January 1, 1912.....	\$1,744.41	
Furniture and supplies	20.00	
Bound bulletins unsold (4).....	5.00	
Dues payable	80.00	
		<u>\$1,849.41</u>

LIABILITIES.

Payment in advance for annual dues.....	\$10.00	
Payment in advance for badges.....	10.00	
Payment in advance for bound volumes.....	2.50	
Payment for life membership.....	50.00	
		<u>72.50</u>

The treasurer's report for 1908 will be found on page 52, and for 1909 on page 185 of the bulletin; for 1910 on page 7, of bulletin No. 32. Gross income and expenses for the first four years of the Society's existence compare as follows:

	1908 (7 mos.)	1909	1910	1911
Gross income	\$1,200.00	\$1,605.75	\$1,880.49	\$2,315.00
Total expenses	691.50	1,068.99	1,543.97	2,013.20
Excess of income. \$	508.50	\$ 536.76	\$ 336.52	\$ 301.80
Cash bal. on hand	508.50	1,045.26	1,381.78	1,744.41

The following is a more detailed comparison of the receipts and expenditures in 1910 and 1911:

	1910	1911
Cr. Cash on hand first of year.....	\$1,045.26	\$1,381.78
Annual dues received for 1909.....	60.00	10.00
Annual dues received for 1910.....	1,783.00	60.00
Annual dues received for 1911.....	10.00	2,235.00
Annual dues received for 1912.....	.....	10.00
Phila. Sec. in settlement of account...	.....	1.33
All other receipts (1911).....	.....	157.97
Received from New York Section in settlement of account.....	27.05	.....
Received for back numbers of bulletin.	44	.....
Total	<u>\$2,925.75</u>	<u>\$3,856.08</u>
Dr. Printing Bulletins, Lists, etc.....	\$677.32	\$758.73
Salary of Assistant Secretary-Treasurer	470.00	304.00
Stenography and typewriting.....	185.79	596.96
Postage, telegraphing and expressage..	79.23	136.41
Stationery and office supplies.....	36.05	97.80
Bills paid on account of New York Sec.	68.65	72.64
Bills paid on account of Phila. Sec....	14.00	.....
Auditing accounts of the Society.....	10.00	.....
Bank exchange	2.93	5.51
Other expenditures (1911).....	.....	139.62
Total expenditures	<u>\$1,543.97</u>	<u>\$2,111.67</u>
Cash on hand, end of year.....	1,381.78	1,744.41
	<u>\$2,925.75</u>	<u>\$3,856.08</u>

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The running expenses during 1911 are most clearly stated as follows:

Printing	\$758.73
Salaries	304.00
Stenography and typewriting	596.96
Postage, telegraphing, etc.....	136.16
Stationery and office supplies.....	95.80
Section aid	74.64
Exchange	5.00
Expenses of annual meeting.....	16.70
Incorporation	14.46
Designing of emblem.....	7.00
Binding bulletins for officers' use.....	3.75
Total	\$2,013.20

It appears that the expenses during 1911 are about what is to be expected under present conditions.

W. R. INGALLS,
Treasurer.

COMMUNICATIONS.

F. W. Parsons.—In view of the recent action of the Mining and Metallurgical Society in drafting a new bill for the U. S. Bureau of Mines, it will be of interest to put on record in the bulletin of the Society the bill that has been introduced, under date of Jan. 8, 1912, in Congress in the House of Representatives by the Hon. Martin D. Foster, chairman of the Committee on Mines and Mining. Mr. Foster's bill, which is H. R. 17260, is as follows:

A bill to amend an Act entitled "An Act to establish in the Department of the Interior a Bureau of Mines," approved May sixteenth, nineteen hundred and ten.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Act to establish in the Department of the Interior a Bureau of Mines, approved, May sixteenth, nineteen hundred and ten, be, and the same is hereby amended to read as follows:

"That there is hereby established in the Department of the Interior a bureau of mining, metallurgy, and mineral technology, to be designated the United States Bureau of Mines, and there shall be a director of said bureau, who shall be thoroughly equipped for the duties of said office by technical education and experience and who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall receive a salary of six thousand dollars per annum; and there shall also be in the said bureau such experts and other employees, to be appointed by the Secretary of the Interior, as may be required to carry out the purposes of this Act in accordance with the appropriations made from time to time by Congress for such purposes.

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"Sec. 2. That it shall be the province and duty of the Bureau of Mines, subject to the direction of the Secretary of the Interior, to conduct inquiries and scientific and technologic investigations concerning mining, and the preparation, treatment, and utilization of mineral substances, with a view to increasing health, safety, efficiency, economic development, and the prevention of waste in the mining, quarrying, metallurgical, and other mineral industries, and concerning explosives and fuels and unfinished mineral products belonging to, or for the use of, the United States, with a view to their most efficient use; and to disseminate information concerning these subjects in such manner as will best carry out the purposes of this Act.

"Sec. 3. That the director of said bureau shall prepare, publish, and distribute, subject to the direction of the Secretary of the Interior, under the appropriations made from time to time by Congress, reports of inquiries and investigations, with appropriate recommendations of the bureau, concerning the nature, causes, and prevention of accidents, and the improvement of conditions, methods, and equipment, with special reference to health, safety, and prevention of waste in the mining, quarrying, metallurgical, and other mineral industries; the use of explosives and electricity, safety methods and appliances, and rescue and first-aid work in said industries; the causes and prevention of mine fires; and other subjects included under the provisions of this Act.

"Sec. 4. That nothing in this Act shall be construed as authorizing the Bureau of Mines or any employee of said bureau to undertake any investigation or operation in behalf of any private party, except, with the approval of the Secretary of the Interior, for the health and safety of persons employed in the mining, quarrying, metallurgical, or other mining industries; nor shall the director or any member of said bureau have any personal or private interest in any mine or the products of any mine under investigation: *Provided*, That nothing herein shall be construed as preventing the employment by the Bureau of Mines, in a consulting capacity or in the temporary investigation of special subjects, of any engineer or other expert whose principal professional practice is outside of such employment by said bureau.

"Sec. 5. That for tests or investigations authorized by the Secretary of the Interior under the provisions of this Act, other than those performed for the Government of the United States or State governments within the United States, a reasonable fee covering the necessary expenses shall be charged, according to a schedule prepared by the Director of the Bureau of Mines and approved by the Secretary of the Interior, who shall prescribe rules and regulations under which such tests and investigations may be made. All moneys received from such sources shall be paid into the Treasury to the credit of miscellaneous receipts.

"Sec. 6. That this Act shall take effect and be in force on and after its passage."

PERSONALS.

Albert Burch, of San Francisco, represents the California Exploration Company, a Bewick, Moreing & Co. corporation, in the development of the Plymouth Consolidated mine in Amador County, California.

S. H. Chauvenet has been elected president of the Eastern Pig Iron Association for 1912.

George E. Collins has been elected president of the Colorado Scientific Society. Mr. Collins has gone to England on professional business, expecting to return to Denver in February.

The School of Mines and Metallurgy of the University of Missouri on Oct. 24, 1911, conferred upon William Rowland Cox the honorary degree of Engineer of Mines, the highest honor it could grant. Mr. Cox entered the school in 1893 and remained there during three years. Mr. Cox has recently opened an office at Los Angeles.

C. C. Derby has been appointed consulting engineer for the Tightner Mines Company, which has been incorporated to operate the Tightner, Red Star and other mines in the Alleghany district, California.

Edward L. Dufourcq recently completed an examination of the Sovereign mine, in Ladies' Canyon, Sierra County, California.

H. H. Knox is examining mines in Bulgaria.

W. W. Mein, until recently with the Robinson Deep mines in the Transvaal, has been appointed consulting engineer for the Dome Mines, Ltd., of Porcupine, Ont.

CHANGES OF ADDRESS.

Brayton, Corey C...701 People's Bank Bldg., Sacramento, Cal.
Jennings, Hennen...c/o H. C. Perkins, 15 Broad St., New York
Prichard, Wm. A.....c/o Bank of Palo Alto, Palo Alto, Cal.
Pringle, Chas. A...c/o Babicora Dev. Co., Madera, Chih., Mex.
Spaulding, Morrill B.....32 Liberty St. New York

MEMBERS ELECTED IN JANUARY 1912.

Laird, George A.....Minas de San Pedro, Chihuahua, Mexico
Mgr., Candelaria Mining Co.

Riter, Geo. W....Deseret Nat'l Bank Bldg., Salt Lake City, Utah
Sec'y and Mgr., Eureka Hill Mining Co.

Roberts, Milnor.....University Station, Seattle, Wash.
Professor of mining engineering and metallurgy,
University of Washington.

Mining and Metallurgical Society *of America*



Bulletin Number Forty-five
February 29, 1912
Vol. V, No. ii

Published at the Office of the Secretary
505 Pearl St., New York.

OFFICERS FOR 1912.

President, J. PARKE CHANNING, 42 Broadway, New York.

Vice-President, J. R. FINLAY, 52 William St., New York.

Secretary, { W. R. INGALLS, 505 Pearl St., New York.
Treasurer, }

Executive Committee: Messrs. H. M. Chance, J. Parke Channing, J. R. Finlay, W. R. Ingalls and H. S. Munroe.

COUNCIL.

At large, ex-officio.

J. Parke Channing, 42 Broadway, New York.....Retires January, 1913
 J. R. Finlay, 52 William St., New York.....Retires January, 1913
 W. R. Ingalls, 505 Pearl St., New York.....Retires January, 1913

Districts 1-2-3.—New York and New England.

H. S. Munroe, Columbia University.....Retires January, 1913
 T. H. Leggett, 25 Broad St.....Retires January, 1914
 J. F. Kemp, Columbia University.....Retires January, 1915

Districts 4-5.—New Jersey, Pennsylvania, West Virginia, Ohio and Maryland.

H. M. Chance, Philadelphia.....Retires January, 1913
 F. Lynwood Garrison, Philadelphia.....Retires January, 1915

District 6.—District of Columbia and Southern States.

Waldemar Lindgren, Washington.....Retires January, 1914

District 7.—Michigan, Minnesota, Wisconsin, Illinois, Iowa and Missouri.

H. V. Winchell, Minneapolis.....Retires January, 1914

District 8.—Colorado, Utah and Nevada.

Philip Argall, Denver.....Retires January, 1915

Districts 9-10.—Oregon, Alaska and California, except Los Angeles, Santa Barbara and Pasadena.

H. F. Bain, San Francisco.....Retires January, 1914
 F. W. Bradley, San Francisco.....Retires January, 1915

District 11.—Arizona, Mexico, Texas, Oklahoma and those places in California not included in districts 9-10.

S. W. Mudd, Los Angeles.....Retires January, 1913

District 12.—Montana, Idaho, Washington and Canada.

C. W. Goodale, Butte.....Retires January, 1913

OFFICERS OF SECTIONS.

SAN FRANCISCO.

S. B. Christy,
Chairman.

H. F. Bain,
Secretary.

NEW YORK.

Geo. C. Stone,
Chairman.

F. G. Spilsbury,
Vice-Chairman.

Louis D. Huntoon,
Secretary.

PHILADELPHIA.

R. H. Sanders,
Chairman.

F. Lynwood Garrison,
Secretary.

Mining and Metallurgical Society of America

Vol. V

February 29, 1912.

No. 2

ANNOUNCEMENTS.

Errata.—In the minutes of the annual meeting, reported in the Bulletin of Jan. 31, 1912, it was said that the fourth annual meeting * * * was held * * * Tuesday, Jan. 9, 1911." Of course January 9, 1912, was meant, the error being typographical.

In the report of the secretary, in the same Bulletin, it was stated that certain subjects were discussed by all the sections "except that the San Francisco section did not take up professional ethics." This statement was an error, occurring through inadvertence. In fact the San Francisco section did take up the matter of professional ethics at its meeting on May 5, 1911, and passed a resolution approving the draft of the Philadelphia section.

Badge.—The badge of the Society, officially adopted by the Council, may be obtained from the Secretary at a cost of \$5 when made in gold, silver and blue enamels; \$20 when made in gold, platinum and blue enamel. The badge may be obtained either as a pin or as a watch-charm. In ordering, be particular to state which form is wanted.

Bound Volumes.—Bound volumes of the Bulletin of the Society for 1911 may be obtained from the Secretary for the price of \$1.50. Any member desiring a complete set of the bulletins for 1911 unbound can obtain it, free of charge, by application to the Secretary.

W. R. INGALLS,
Secretary.

COUNCIL.

A meeting of the council was held at the Engineers' Club, New York, on Thursday, Feb. 15, at 5.15 p. m. The members present were Messrs. Channing, Finlay, Garrison, Ingalls and Munroe.

The Secretary reported that at a meeting of the San Francisco section, Dec. 19, 1911, a motion was adopted to the effect that the council be requested to select and submit to the members of the Society names of persons who might properly be recommended for appointment by the President of the United States to fill the present vacancy upon the Supreme Bench, in order that the Society may select one upon whom it can unite in making a recommendation.

The Philadelphia section at a meeting on Feb. 6, 1911, passed a motion to the effect that the Society take some suitable and formal action in commemoration of Dr. E. R. Buckley, a member of the Society, recently deceased.

At the same meeting the Philadelphia section passed a motion requesting the Secretary of the Society to call the attention of the council to the probability of the next meeting of the American Mining Congress (in the autumn of 1912) being held in Philadelphia, and requesting that the council appoint delegates of the Mining and Metallurgical Society to attend that meeting.

The Secretary reported the receipt of the following letter, under date of Feb. 5, 1912, from F. W. Bradley, councillor: "The engineers of San Francisco are endeavoring to work up the holding of an International Engineering Congress during the time of the Panama-Pacific Exposition in 1915. As you will be formally notified in accordance with the memorial and report (advance copy of which I herewith hand you), the Mining and Metallurgical Society of America has been honored as constituting one of the seven leading engineering societies of this country. I think it will be a very good thing for our Society, if the Executive Committee should take up the matter of holding some kind of a meeting here in 1915."

The Secretary read the following letter, under date of Feb. 10, 1912, from H. F. Bain, councillor:

"One matter needs immediate attention. The Raker bill, of which I enclose copy, has provoked a very proper protest on the part of the commercial assayers and chemists. I will ask Mr. Hanks to send you a signed copy of their resolution. I enclose reprint. This matter was brought up at our meeting and the feeling was that the protest was well founded and that in view (1) of resolutions passed by the San Francisco section for presentation to the American Mining Congress, October, 1910, but killed by the council of the society and hence presented at Los Angeles as private matter, condemning incursions by the Bureau of Mines into the field of private work, and (2) action of the Society itself in the Bureau of Mines in which one of the principles formulated was 'That governmental encroachment

upon private enterprises should be prevented by the organic law,' the council of the Society should be asked to take prompt and vigorous steps to protest against the Raker bill. As a matter of fact, I think the Raker bill has no show of passage but the protest will be valuable on general principles. Probably a direct protest from San Francisco would be most effective since in this particular case California is assumed to be going to get the large slice of pork and in view of the action of the Society on the principles involved, this might be a proper case for the San Francisco section to take the initiative."

The motion adopted by the San Francisco section, Dec. 19, 1911, to the effect that the council be requested to select and submit to the members of the Society names of persons who might properly be recommended for appointment by the President of the United States to fill the present vacancy upon the Supreme Bench was, upon motion, duly seconded, and unanimously carried, disapproved for the reason that while the Mining and Metallurgical Society may properly indorse principles and measures of general professional interest, it may not safely enter upon the endorsement or recommendation of individuals.

The resolution of the Philadelphia section on Feb. 6, 1912, to the effect that the Society take some formal action in commemoration of Dr. E. R. Buckley was, upon motion, duly seconded, and unanimously carried, accepted with instructions to the Secretary to publish an obituary notice of Dr. Buckley in an early bulletin of the Society and forward a copy of that bulletin to the nearest relative of Dr. Buckley, accompanied by a suitable letter.

The request, of the Philadelphia section, made at its meeting on Feb. 6, 1912, that the council appoint delegates of the Mining and Metallurgical Society to attend the next meeting of the American Mining Congress was considered. Upon motion, duly seconded, and unanimously carried, the President of the Society was authorized to appoint delegates to attend meetings of other societies upon invitation to do so.

Upon motion, duly seconded, and unanimously carried, the Secretary was instructed to acknowledge the receipt of the invitation of the president and secretary of the delegates to the meeting held in San Francisco Jan. 15, 1912, to formulate plans to hold an International Engineering Congress in connection with the Panama-Pacific Exposition in 1915; and to say that the Mining and Metallurgical Society would participate fully in the plans for the proposed International Engineering Congress, and would communicate more specifically as to its participation at a later date, after further consideration of the report of the delegates, and to give immediate assurance that a general meeting

of the Mining and Metallurgical Society in San Francisco in connection with the proposed International Engineering Congress would be called.

Upon motion, duly seconded, and unanimously carried, the several local sections of the Society were requested to discuss the subject of "The Paralysis of Mining Districts; the causes thereof and the remedies therefor."

With respect to the communication from H. Foster Bain, councillor, pertaining to the Raker bill, now before the House of Representatives, and possible action by the Society, the council considered that the action of the Society, already taken formally by the entire membership, upon the matter of the Bureau of Mines, fully expressed the attitude of the Society toward federal activity in the mining industry, and that no further action by the Society is necessary; and that the Society having already taken such action there is no reason why members of the Society, individually or collectively, as a local section or otherwise, should not oppose legislation conflicting with the principles adopted by the Society; and upon motion, duly seconded, and unanimously carried, the San Francisco section was authorized to exert such influence against the Raker bill as it sees fit to do.

W. R. INGALLS,

Secretary.

MINUTES OF MEETINGS.

NEW YORK.

The February meeting of the New York section was held, after an informal dinner, at the Engineers' Club, on Thursday, Feb. 15, at 8.30 p. m. The meeting was called to order by the chairman, Mr. Stone. In the absence of Mr. Huntoon, the secretary, Mr. Sharpless was appointed secretary *pro tem*.

Those present were: Messrs. R. M. Catlin, J. Parke Channing, E. F. Eurich, J. R. Finlay, T. France, F. L. Garrison, B. B. Gottsberger, W. R. Ingalls, E. B. Kirby, H. S. Munroe, E. H. Nutter, R. Peele, A. L. J. Queneau, S. F. Shaw, O. Sussman, B. Stoughton, F. F. Sharpless, M. B. Spaulding, G. C. Stone, E. G. Spilsbury, A. H. Wethey.

The Chairman.—As the last meeting was at the same time as the annual meeting, no business was transacted, and therefore we have no minutes tonight. Our subject will be the continuation of the discussion of the proposed code of ethics. Before going ahead, however, I will ask the secretary to read some communications in regard to the Bureau of Mines.

W. R. Ingalls.—At the meeting of the council this afternoon consideration was given to a report of the last meeting of the San Francisco section, at which the proposal to create experimental metallurgical and mining stations under the Bureau of Mines, these stations to do free assaying and all kinds of free work, was discussed. The members of the San Francisco section are opposed to this project. The private assayers in California also seem to be in the same frame of mind. They desired the council immediately to lead the Society into taking some action on this question. The council considered that the Society had already taken action on the question and that there was nothing more that it could do except to repeat the expression of opinion that has already been made, which expression of opinion was by the whole Society on the deliberate vote of the membership. The California section is in error in considering this purely a California question, having in mind a particular bill that had been introduced in the House of Representatives for the establishment of one of these stations in California. As a matter of fact that is only part of a general movement, bills having been introduced for the establishment of similar stations in Colorado and Wyoming, and in fact one blanket bill proposes such an establishment in every state. I mentioned at the council meeting that I had been having some correspondence with the Hon. Martin D. Foster, chairman of the committee on Mines and Mining, House of Representatives, bearing on this subject, and the opinion was expressed that the meeting this evening might be interested in hearing this correspondence.

(Four letters passing between Mr. Ingalls and Hon. M. D. Foster were then read.)

The Chairman.—At the conclusion of the November meeting, when we discussed the proposed code of ethics, Mr. Lawrence moved that this discussion be continued and take in other codes, but we have been busy with other questions and have not been able to take this up until tonight.

J. R. Finlay.—I am not quite sure that I have kept track of the discussion on this subject, and I am a little afraid that I may be going over ground that has already been covered, but I would like to read the few remarks that I have prepared.

In speaking of the ethics of our profession, have we not been unconsciously thinking of that small part of it made up of consulting engineers? It occurs to me to point out that mining as a profession is strictly a commercial occupation, the object of which is gain. Holes in the ground are not designed to satisfy any aesthetic tastes. People work in them or invest in them only for one purpose that is at all logical or worth considering—

the production of wealth. The ethics of such an occupation are simply business ethics, and I see no principles of morality involved which do not apply with equal force to business in general.

It is different with the time-honored liberal professions—divinity, the law and medicine. The essential motive underlying these is the welfare of humanity. The province of the clergyman is to build up the moral fiber of the people, that of the lawyer to promote and regulate social intercourse, that of the physician to conserve life and health. It is no part of the training of these professions to learn to make money for anybody. That may follow as a recompense for service, but that recompense is not the essence of either the career or the service. It is a mere recognition of the value of such service, and the proof of this is that many of the highest in these professions are men who have taken them up as a duty to perform.

Similarly I should say that we might make a class of political professions such as service in the army and in the government. At the root of the dignity of this kind of employment, no doubt is the sense of power, of domination and leadership, which is so gratifying to self-esteem that men are often willing to spend their fortunes to obtain positions in these occupations, instead of getting the position for the sake of fortunes.

Some professions are purely aesthetic, such as art and music. The motive of such effort is to please the senses and tastes, and also to develop the mind by the exhibition of its powers. To obtain excellence, which must be measured by aesthetic standards and not by commercial valuations, is the true aim of effort of this kind.

Still other professions are partly aesthetic and partly economic, such as civil engineering and architecture. In these the tests of excellence may be either engineering perfection, or profit, or both.

But if there are any purely commercial engineers, the mining engineer is surely one of them. We must submit to having all our achievements measured by a scale marked in dollars and cents. Undoubtedly the mass of educated men are willing now to concede that high scientific attainments may properly be applied to the production of wealth. That kind of effort is no longer looked down upon. But in considering what shall be our ethical point of view we certainly should make it an economic point of view.

These remarks apply to the profession as a whole, as expressed by the activity of its members in the industry. A variation is encountered in the case of the consulting engineer. How many men of this class are really independent practitioners?

A very large number of our most prominent consulting engineers are regularly employed by certain interests, for whom they become employees in the ordinary sense, but may act occasionally as advisers for clients drawn from the public. When they are so employed they are supposed to give an absolutely faithful statement of the facts as they see them, and of the conclusions which they draw from them. That is about all there is to it. It may be pointed out that public assayers act in this relation to clients more regularly than our most famous engineers.

It seems therefore pretty plain that the ethics of mining engineering can best be described as the ethics of any honorable man engaged in the business of mining. Just as in any other business, the man engaged in mining owes loyalty to his employers or associates, and this loyalty requires that he must make his enterprise, or his part of it, profitable. That is the object of commercial life. Of course, his pursuit of profit must be carried on with proper respect for the laws and for decent conduct. But a knowledge of what constitutes proper conduct is a part of the education of every good citizen. So many citizens are engaged in commercial occupations exactly parallel to mining, so far as morality goes, that if we try to define the ethics of mining practice we shall have to erect a school of business morality, and that will be difficult.

It seems to me that the ethics we are talking about are really the ethics of that kind of a man, and it seems to me that the only serious question that one has to consider is the question whether he is a good citizen and an honest man. Your duty is to tell the truth, but outside of that I do not see that any large question of ethics is involved in mining engineering as a profession. I have been unable to see that the exercise of his duties calls in anything except questions of right and wrong, the same as any other kind of business, and it occurred to me that the ethics of our profession, from that point of view, must be decided on different grounds from the ethics, for instance, of law and medicine.

The Chairman.—The first question brought up was whether it was desirable or advisable to discuss a code of ethics at all. At that time we decided it was better to do so. The Philadelphia section drew up a code rather along the line that Mr. Finlay has indicated tonight.

E. G. Spilsbury.—I concur very fully with Mr. Finlay's views on the subject, and if any code is to be adopted it should deal more with the ethical relation of the engineer to his confreres than anything else. Along that line, some rules might be formulated and adopted by the Society, but as to the establish-

ment of a code of ethics to be enforced and to be adopted for the actual conduct of the engineer toward the public, beyond strict honesty, I do not think anything could be promulgated that would be effective.

W. R. Ingalls.—Mr. Chairman, after what my friend Finlay has said, if I read what I sketched out this morning in response to your request, I fear that the meeting may suspect some collusion, but I can assure you that it is only an example of the same idea running coincidently in different minds. This is what I have written.

The subject of professional ethics, now under discussion by this Society, is one that ought to be entered upon in no other way than cautiously. Fortunately it is a subject about which there need be no hurry in coming to a decision and in all probability there will be no demand from our members for action in advance of the report expected from the committee appointed by the President, which has the subject under consideration. The present discussion by this section is only for the assistance of that committee.

The medical and legal professions have well established codes of ethics, the architects have formulated rules of practice, and certain branches of the engineering profession have agreed, or attempted to agree, upon combinations of ethical codes and rules of practice. Before attempting to imitate any of these, however, the Mining and Metallurgical Society should carefully consider the conditions existing in the profession that it represents.

We include among our membership, and in our profession generally, a good many men who call themselves consulting engineers, although in fact they are in direct charge of single corporate operations, and are engaged in no other field of activity. Some of the most distinguished mining engineers confine their work to operations on their own account and could not be persuaded to accept a mere fee in any circumstances. We are in fact a collection of engineer-operators, engineer-managers, etc., with relatively few purely professional consulting engineers, i. e., engineers to whom clients go for advice or the performance of specific temporary services as they do to medical men, lawyers and members of other professions. It is unfortunate that the demand for such independent service is not larger than it is. Many mining bubbles that have been suddenly punctured, to the distress of investors, might undoubtedly have been avoided if the reports of the managements had been reviewed by independent engineers. It is not my present purpose, however, to divert into a discussion of that phase of corporate management.

With respect to the practice of the engineering profession we must take conditions as they exist.

Assuming conditions to exist as I have stated, it will be manifestly impossible for the Society to formulate any such radical expression of views as, for example, that it would be unprofessional for an engineer to be interested, as a stockholder, in a company upon whose affairs he may report. Such a rule would strike unfairly some of our own members for whom we have the highest respect. I cite this merely as a single example of the difficulty in attempting any formulation of a code of ethics for our profession. Others of similar character will doubtless occur to all of you.

I think it would be useful for us to have a code of ethics and rules of practice, or a combination of both. Both will give assistance especially in defining the relations between engineers and their clients. The latter may be assumed to be generally ignorant, and there are perhaps young engineers who act unprofessionally sometimes, not out of disregard of ethics, but out of ignorance. As a broad generalization the golden rule ought to cover the whole gamut of a code of ethics, but there are many things upon the dividing line between right and wrong and all consciences are not alike. I feel, however, that in formulating such a code as we are now considering we must avoid narrow views and, pending final adoption by the Society, we must carefully avoid public reference to any tentative drafts that have been presented to the Society for consideration.

E. B. Kirby.—I had my attention drawn to the ethics of codes a number of years ago when I was living with friends who were physicians, and happened to get into pretty close touch with the working operations of the code in that profession. It has also been my fortune to know repeatedly the working of the code existing in the legal profession. In each of these two cases (these are two of the three old standard professions), a very profound impression was made on my mind, and it is my opinion that it is out of the question to express any rules which will fit the endless complexities of human life and conditions. The great trouble today is that there are too many rules. Law has made an attempt to regulate men by an expression of rules. We see now how lame the attempt has been.

Robert Peele.—I think when the subject was discussed at the last meeting it was the general opinion that it was unwise to go into too much detail. Following out the remarks already made, the members of the committee in charge of the revision of this first draft might bear in mind the principles which I have always understood governed those who wrote the Constitution

of the United States—no details, only broad principles. I also make the suggestion that possibly the title might be changed to Code of Principles of Professional Conduct. It is a little longer, but it more accurately describes what we are after. Ethics may be defined as the science of morals. An inspection of the proposed rules shows that many of them in no way relate to moral conduct, but merely involve questions of expediency.

The Chairman.—Mr. Lawrence, the only member of the committee present when we last discussed the subject, asked whether it would be practicable to discuss other codes, more in the line of what to do and what not to do.

J. Parke Channing.—If there is anything in analogy (analogy is a dangerous form of reasoning), certain things are analogous between manager and physician. I would like to ask if it is proper for a physician, who finds his patient in the last stages of a disease, to tell him that he is going to die; and if a manager finds that his mine is going to peter out, whether he should tell his stockholders.

J. R. Finlay.—A physician has to conserve life; therefore his duty would be to lie to the patient and to encourage him so that he may live as long as possible. In the case of the mine, the manager could save the owners a lot of money. There is a distinction on economic grounds.

J. Parke Channing.—Seriously, I cannot agree with Mr. Finlay, because I have always maintained that the two professions are more nearly analogous than any other two. In each case the physician or surgeon, or the mining engineer, is contending with nature in one of her myriads of different forms. The civil, the mechanical or the electrical engineer has simply to deal with certain things. The physician may have a thousand different patients and the thousand and first is entirely different. A mining engineer may examine a thousand kinds of different ore-bodies, and the thousand and first is different from the rest. So I think there is a certain analogy. As long as there is life there is hope, and as long as there is a shaft and a drift there is hope of finding another ore body.

H. S. Munroe.—The chairman of the committee on ethics has asked the Society, and particularly the New York section, for expressions of opinion on some of these other codes, for the guidance of the committee in framing its report. Cannot we spend a few minutes at least in performing that service for the committee. At the meeting, Mr. Lawrence asked for just that

service, and I suggest that the chairman read each of the sections so that we can give a yes or no vote.

The Chairman.—If there is no objection we will proceed in that way.

C. R. Corning.—Have we not delegated this matter to the committee for consideration. It is not this particular code (referring to the code of the Consulting Engineers); there are a great many other codes. It seems to me that it would be better to await the report of the committee before undertaking to pass a vote on the rules for a code of ethics.

E. G. Spilsbury.—I agree with Mr. Corning that the committee which has been appointed should undertake the preliminary discussion, and after they have arrived at some result they can then submit it to the different sections for discussion.

On motion, duly seconded, the meeting adjourned.

F. F. SHARPLESS,
Acting Secretary of Section.

PHILADELPHIA.

A meeting and dinner of the Philadelphia section was held at the Union League Club, on the evening of Feb. 6, 1912. Members present: Messrs. Conner, DuBois, Garrison, Hixon, Chance, Chauvenet, Spurr and Fairchild. Mr. Hutchinson was unable to attend on account of a sudden illness, and Mr. Lathrop, by reason of business engagement. In the absence of the chairman, Mr. Sanders, in Mexico, Mr. Chauvenet was elected to preside at the meeting.

Minutes of the previous meeting, held Nov. 9, 1911, were approved.

The secretary reported that in reply to his circular letter of Nov. 20, 1911, appealing to the members for funds to conduct the work of the section, he had received \$5 each from ten members, \$4 each from two, and one of \$3, giving a total of \$61, which, added to a remittance of \$3.50 from the Society for stenographer's charges at meetings, gave \$64.50. Bills to the amount of \$30.25 were paid by the secretary out of this sum, leaving a balance in his hands of \$34.25. On motion, duly seconded, this account of the secretary was approved.

The secretary read a letter from George S. Rice, member of the section, announcing that there would be an explosion at the Pittsburg experiment station on Feb. 10, and that any members desiring to attend would be made welcome.

Mr. Conner called attention to the recent death of Dr. E. R. Buckley, in Chicago, on Jan. 18, 1912, and moved that the secretary of the section be requested to write to the council of the

Society calling attention to this sad and untimely loss, and expressing the wish of the section that some suitable and formal action be taken by the Society regarding it. Being duly seconded, the motion was unanimously carried.

The probability that the next meeting of the Mining Congress would be held in Philadelphia during the ensuing fall was brought to the attention of the section by Mr. Conner. After considerable discussion regarding the relations of the Congress to the mining industry, and especially to our Society and to the profession, it was moved by Mr. Fairchild, and seconded, that the secretary of the section be requested to write to the council, calling attention to the subject, with the request that the council appoint delegates from the Society to attend this Congress. The motion was carried.

The secretary called attention to some personal correspondence he had been having with Mayor Blankenburg and with the Director of Public Works of Philadelphia, in regard to co-operation of engineers residing in Philadelphia in the work of reform and improvement in the city government. This matter is of especial interest in view of the fact that engineering questions of magnitude and great importance are likely to arise in the near future in the development of subways and in other matters wherein mining engineers might be especially fitted, by their training and experience, to give disinterested and valuable advice.

After considerable discussion, a resolution was offered, to the effect that inasmuch as the Mining and Metallurgical Society is a national organization, it might not with due regard to its character and purposes concern itself, as an organization, with purely local affairs; but that as individuals, the members of the Philadelphia section would be glad to offer their services to the Mayor and the Director of Public Works when called upon. On motion of Dr. Chance, duly seconded, this resolution was unanimously adopted, and the secretary was directed to communicate its substance to Director Cooke.

An informal discussion of the relations between the Society and the American Institute of Mining Engineers took place. No formal action was taken regarding the matter.

On motion, the meeting adjourned at 10.30 p. m.

F. LYNWOOD GARRISON,
Secretary of Section.

SAN FRANCISCO.

A meeting of the San Francisco section was held on Feb. 5, but its minutes were not received by the secretary in time for publication in this bulletin.

PERSONALS.

Ralph Arnold recently completed a geological survey of various fields in Trinidad in the interest of the Consolidated Goldfields of South Africa.

John C. Branner has been presented by the Philadelphia Academy of Natural Science with the Hayden medal for the year 1912. This medal is conferred every three years on the man who, in the estimation of the academy, has done the most for the advancement of the geology and palaeontology in that period. Dr. Branner is the fourth American to receive the medal, which was awarded first in 1888.

Albert Burch has formed a partnership with Gelasio Caetani and Oscar H. Hershey, with offices in the Crocker building, San Francisco. The firm will engage in mining engineering, ore dressing and economic geology.

L. D. Huntoon is directing development work at the Alice Dayton mine, near Wentworth, Missouri.

Prof. J. F. Kemp will address the New York section of the American Institute of Mining Engineers, March 22, on "Iron Mining in Swedish Lapland." On Feb. 20, Prof. Kemp was elected president of the A. I. M. E. for 1912.

OBITUARY.

E. R. Buckley.—The many friends of Dr. E. R. Buckley will be grieved to hear of his death from pneumonia at Chicago, Jan. 19, followed by the tragic death of Mrs. Buckley. Those who knew the ideal happiness of their married life will not be surprised to learn that she was unable to recover from the shock caused by the loss of her husband.

Doctor Buckley graduated from the University of Wisconsin in 1895 with the degree of B.S., to which was added that of Ph.D. in 1898.

During the practice of his profession as a geologist he served upon the state geological survey of Wisconsin, and for seven years was state geologist of Missouri and director of the State Bureau of Geology and Mines, at Rolla, Mo. He then entered the service of the American Smelters Securities Co. as geologist of the Federal Lead Co., Flat River, Mo., where he was engaged for several years in conducting its exploration work. Withdrawing from this a few months ago he began general consulting practice as a mining geologist with offices in Chicago.

Doctor Buckley was a member of various scientific and

technical societies, and was especially active in the work of the American Mining Congress, having been president of that organization and a director at the time of his death. He was a charter member of the Mining and Metallurgical Society of America and was a member of its council in 1910 and 1911.

He was a frequent contributor to professional journals and was the author of various works and reports, the best known of these being the "Geology of the Zinc and Lead Deposits of Granby, Southwest Missouri," and the "Geology of the Disseminated Lead Deposits of St. Francois and Washington Counties, Missouri."

Dr. Buckley's contributions to the subject of mining geology were of noteworthy value, the best evidence of which is the high appreciation of them in the mining districts to which they pertain. Dr. Buckley was not a scientist who confined his studies to his office and library, but rather was he a field man who went into the mines and filled his note books by keen observation and patient study of things as they appeared underground.

The attainments and character of Doctor Buckley call for more than this formal record. He was not only prominent and successful professionally but was influential as a man. This was due to a high character and strong personality, and also to his active interest in public affairs and the general welfare of the mining industry. In summing up the record of a man's life these latter qualities seem to far outweigh all the others. No one can live to himself alone, and the man who not only does his professional work well but also plays his part in the world of men, trying to make things better, is an inspiration to all.

CHANGE OF ADDRESS.

Arnold, Ralph.....917 Union Oil Bldg., Los Angeles, Cal

MEMBERS ELECTED IN FEBRUARY, 1912.

Dwight, Arthur S.....25 Broad Street, New York
 President, Dwight & Lloyd Metallurgical Co.
 Smith, William Allen.....Herculaneum, Mo.
 Manager, St. Joseph Lead Co.

Mining and Metallurgical Society *of America*



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OFFICERS FOR 1912.

President, J. PARKE CHANNING, 42 Broadway, New York.

Vice-President, J. R. FINLAY, 52 William St., New York.

Secretary, { W. R. INGALLS, 505 Pearl St., New York.
Treasurer, }

Executive Committee: Messrs. H. M. Chance, J. Parke Channing, J. R. Finlay, W. R. Ingalls and H. S. Munroe.

COUNCIL.

At large, ex-officio.

J. Parke Channing, 42 Broadway, New York.....Retires January, 1913

J. R. Finlay, 52 William St., New York.....Retires January, 1913

W. R. Ingalls, 505 Pearl St., New York.....Retires January, 1913

Districts 1-2-3.—New York and New England.

H. S. Munroe, Columbia University.....Retires January, 1913

T. H. Leggett, 25 Broad St.....Retires January, 1914

J. F. Kemp, Columbia University.....Retires January, 1915

Districts 4-5.—New Jersey, Pennsylvania, West Virginia, Ohio and Maryland.

H. M. Chance, Philadelphia.....Retires January, 1913

F. Lynwood Garrison, Philadelphia.....Retires January, 1915

District 6.—District of Columbia and Southern States.

Waldemar Lindgren, Washington.....Retires January, 1914

District 7.—Michigan, Minnesota, Wisconsin, Illinois, Iowa and Missouri.

H. V. Winchell, Minneapolis.....Retires January, 1914

District 8.—Colorado, Utah and Nevada.

Philip Argall, Denver.....Retires January, 1915

Districts 9-10.—Oregon, Alaska and California, except Los Angeles, Santa Barbara and Pasadena.

H. F. Bain, San Francisco.....Retires January, 1914

F. W. Bradley, San Francisco.....Retires January, 1915

District 11.—Arizona, Mexico, Texas, Oklahoma and those places in California not included in districts 9-10.

S. W. Mudd, Los Angeles.....Retires January, 1913

District 12.—Montana, Idaho, Washington and Canada.

C. W. Goodale, Butte.....Retires January, 1913

OFFICERS OF SECTIONS.

SAN FRANCISCO.

S. B. Christy,
Chairman.

H. F. Bain,
Secretary,

NEW YORK.

Geo. C. Stone,
Chairman.

E. G. Spilsbury,
Vice-Chairman.

Louis D. Huntoon,
Secretary.

PHILADELPHIA.

R. H. Sanders,
Chairman.

F. Lynwood Garrison,
Secretary.

Mining and Metallurgical Society of America

Vol. V

March 30, 1912.

No. 3

ANNOUNCEMENTS.

Badge.—The badge of the Society, officially adopted by the council, may be obtained from the Secretary at a cost of \$5 when made in gold, silver and blue enamels; \$20 when made in gold, platinum and blue enamel. The badge may be obtained either as a pin or as a watch-charm. In ordering, be particular to state which form is wanted.

Bound Volumes.—Bound volumes of the Bulletin of the Society for 1911 may be obtained from the Secretary for the price of \$1.50. Any member desiring a complete set of the bulletins for 1911 unbound can obtain it, free of charge, by application to the Secretary.

W. R. INGALLS,
Secretary.

MINUTES OF MEETINGS.

NEW YORK.

The March meeting of the New York section was held, after an informal dinner, at the Chemists' Club, on Thursday, March 14, at 8.15 p.m. The meeting was called to order by the chairman, Mr. Stone. Those present were: J. H. Allen, H. M. Chance, A. H. Cowles, E. F. Eurich, E. L. Dufourcq, L. D. Huntoon, W. R. Ingalls, H. H. Knox, G. W. Gray, J. F. Kemp, H. S. Munroe, R. Peele, W. A. Pomeroy, A. H. Rogers, S. H. Ball, D. M. Riordan, F. F. Sharpless, M. B. Spaulding, G. C. Stone, O. Sussman, F. D. Weeks, A. H. Wethey.

The Chairman.—As the minutes of the last meeting have been published in the bulletin, unless there is some objection they will stand approved.

The subject for discussion this evening is "Paralysis of Mining Districts; the Causes and Remedies Therefor." Before going on with this subject I will ask Mr. Ingalls to give us a little account of his late visit to Canada and the Canadian Mining Institute.

W. R. Ingalls.—The Chairman offers a contract larger than the one I entered into. At the dinner table I mentioned my recent visit to Canada and told of a very interesting metallurgical process I had observed at Cobalt; the Chairman suggested that it might be of interest to the members present for me to tell something about it.

[Mr. Ingalls then gave a description of the Nipissing process for the treatment of the high-grade silver ore of Cobalt. This was followed by a discussion in which several members participated.]

The Chairman.—To Mr. Sharpless has been assigned the duty of opening our discussion this evening.

F. F. Sharpless.—Paralysis of a mining district, like paralysis of the human system, may be the result of various causes, and, carrying the analogy further, may or may not yield to treatment. In the majority of cases the disease is likely to be fatal and any medical treatment merely gives temporary relief or allows the patient to linger on until the flickering light finally goes out for the lack of its proper fuel. Generally the cause of the decadence is known, or is not difficult to discover, but that some remedy may be applied with beneficial results is not by any means certain. In fact, many instances that may be recalled present cases simply of exhaustion to be followed by death unless, perchance, new blood from an entirely outside or new source is fortunately discovered and infused into the veins of the expiring patient.

Let me ask these questions: Are not the causes of paralysis of a mining district to be found in natural laws which we, as individuals or communities, cannot abrogate or alter? And are not many of the decadencies to which we may point due to a combination of natural laws and economic conditions over which we as individuals or as societies have but little control? There seem to have been rather few instances in which, at the time a camp assumed a funereal aspect, human effort with its existing store of knowledge could have changed the funeral dirge into a wedding march. In other words, while there are cases in which the cause of decreased production is evident, and activity may be stimulated by applying legislative, mechanical, chemical, or social remedies, the rise and fall of nearly all mining districts can be only slightly assisted or prevented by any artificial human efforts.

One of the most frequent causes of diminished interest is a decreasing number of new finds in a district. So long as new and important discoveries occur, plenty of prospectors will be in the field, plenty of capital for taking up the prospects, and a

thoroughly wide-awake condition will prevail, perhaps more so than actual output warrants. As the new finds diminish in frequency, and property becomes absorbed, the prospector disappears, and the district settles down to the recovery of the metals that have been found. As production grows the prosperity of the camp increases until a maximum is reached; production then diminishes, the camp becomes quieter, and then we are likely to hear someone say, "Well, the prospectors are all dead and gone, what can you expect?" Just as though the poor prospector were to blame for conditions.

This brings us to a consideration of the decline in prospecting. Whether this is more imagined than real is hard to say. When we hear of Steam Boat Mountain and go there we find the prospectors ahead of us. When we get to Porcupine we find that the country for miles around has prospectors running all over it. It seems, however, the consensus of opinion that the prospector, as a type, is fast disappearing from our midst. It is certain that he is not so evident in a number of western counties as he once was; it is true also that new mining camps are not brought into prominence quite so frequently as in former days, and it is possible that this is due to a lack of prospectors. Denver certainly thought so, and has attempted to give a stimulant to the ancient and honorable profession. The result is yet uncertain, but in all probability the example will not be followed by many individuals or companies other than those which have been doing the same thing for years. The formation and operation of a prospecting company is a legitimate and sometimes profitable business; more often it is unprofitable and I doubt very much whether Denver's example will cause many others to do likewise.

Why is it that we see fewer prospectors in the field than twenty years ago? To a certain extent it is because the type of frontiersman who bred them is passing or has passed away. The prospector's place is taken by men ready to work for wages, while the spirit of adventure, the call of the wild, and visions of untold wealth are disappearing. The constant stimulation of new discoveries in some part of the world, which always encourage prospecting in other parts, has been lacking in late years. The surface, in spite of many reports to the contrary, has been pretty well scratched over in many districts, and surface enrichments have been fairly well disposed of. The foregoing state of affairs we cannot alter, and it really seems as though conditions have had more to do with making the prospector than the prospector with making conditions.

There are, however, some other points to be considered. Look at the mine map of Gilpin and Clear Creek Counties of

Colorado, the Cripple Creek, and the Homestake maps. They convey the idea that every foot of ground has been prospected and located. It has indeed been located, but not all has been thoroughly prospected. Much of it is, under existing laws, being conserved for the benefit of future generations. There are many large areas in these and other sections that are doing the present generation no good. They produce no work for the community, no taxes for its support. Whether the large idle holdings should be taxed out of existence is an open question but it is quite certain that if more of this idle land belonged to the Government, and less to the individual, more prospectors would be at work. Here is a field in which state legislation might possibly assist the rejuvenation of a number of camps.

Another direction in which legislation might help the prospector is the interpretation and application of the forestry requirements. Undoubtedly, attempts to secure title to good timber land through the patenting of prospects have been numerous, but also in many authentic instances, work done in good faith has been followed by failure to secure patent, a condition of affairs which has discouraged prospecting on forest reservations. Instances in which incompetent persons have passed on the value of mineral land within reservations have been of so frequent occurrence as to warrant an expression of opinion in regard to the administration of the Forestry Bureau. A most natural remedy in this case would be co-operation between the Forestry Bureau, the U. S. Geological Survey and the Bureau of Mines. Aside from these two suggestions, not much can be done through legislation towards the revival of prospecting.

As to paralysis of districts in which mining has once been active, several observations are to be made. Economic conditions, the demand and supply of the metal, location, transportation facilities, and the state of the arts of mining and metallurgy are all important factors in the upbuilding and downfall of any district. The rise and fall in the price of metals will cause a rise and fall of the districts in which they are produced, regardless of human efforts to assist or retard. In the latter part of the eighties, when the French Syndicate attempted to keep up the price of copper, ruin resulted to the Syndicate, while the inevitable happened to the copper producing districts, and many of them became dormant. As the price became normal in later years, as metallurgical improvements were made and as production costs were lowered, one after another district became active again, while new districts came to the front in response to the demand for the metal and the advance in the art of its recovery. So far has this advance been carried that today copper is pro-

duced under conditions and at figures unapproachable twenty years ago.

Improved methods of mining and treatment can be given as the remedy in many cases, but this comes as a process of evolution and not as one of revolution, not as a remedy that can be handed out from the apothecary shop. It comes as the result of improved practice all over the world and, except for specific cases, cannot be applied until the time and conditions are ripe.

It has been the same with silver as with copper. For years the value of silver has gradually declined in inverse ratio to its annual production without materially affecting the interests that were producing it. Improvements in metallurgy and mining, tending towards lower costs, kept pace with production and with the lower selling price of the metal. In 1893, when the sudden drop occurred, our miners and metallurgists could not quickly adapt themselves to the new conditions; and silver producing districts suffered correspondingly. At that time, nothing but legislation would have given relief, but that would have been only temporary. During the last twenty years the metallurgy of silver has been developing along new lines, and abandoned districts have again come into the field as producers, due to the evolution of processes by which their ores are handled at less cost than formerly.

What is true of copper and silver is true to less extent of gold. The latter, however, having a fixed value, fewer sudden declines of gold districts have occurred. Metallurgical and mining costs have more nearly kept pace with impoverishment. The gold camps seem to die more slowly, and they are less likely to be worth reviving.

The revival of work on the Mother Lode, at Virginia City, at Cripple Creek, in Gilpin County, and in Leadville, is in each instance due to a combination of circumstances. The men on the ground at the time of decadence knew that production was gradually decreasing, but they were powerless to prevent it, because the remedy was beyond their reach. It does not appear that there is a panacea for the paralysis of a mining district. Each district dies or passes into a comatose condition from causes peculiar to itself. A study of each case may show the cause of the trouble and its remedy, though it may be impossible or impracticable to apply that remedy.

Before concluding these remarks it might be well to point to one condition which does tend to prolong the life of a district and in some cases has been the real cause of a second lease of life, a condition brought about by human effort and one that may be fostered by managers and owners. I refer to the efforts of some companies and mining communities towards making

homelike towns for the employees. A man with a home and family ties is a more contented individual than the one living in the mine boarding house. A workman with a neat home in a well organized village has a strong inducement to stay and work very close to that home. He has an interest in the district beyond his monthly check and the closing of the mine in which he is working does not drive him to another camp a hundred or a thousand miles away. Home ties and the force of circumstances tend towards a permanent camp in spite of the price of metals and the cost of production, and this in turn tends to keep the place alive until temporary adverse conditions have passed and normal conditions again stimulate production.

Grass Valley may be taken as a typical instance of the foregoing. The treatment of the employees at the mining camps of Lake Superior, on both copper and iron ranges, is along this line and has produced most satisfactory results. A number of the coal camps can point to equally satisfactory conditions. While this practice may not be applicable in all districts it is worth bearing in mind and worthy of emulation.

The Chairman.—I will call on Mr. Ingalls to tell us what the council had in mind when they selected this subject.

W. R. Ingalls.—What was in the minds of the council was to select a live subject for discussion, and this subject has been brought to the front in some of the Western mining centers, particularly in Denver, where the Chamber of Commerce, the Colorado Scientific Society, the grubstake commission, and other organizations have been giving a great deal of attention to the reviving of, what in some States, Colorado certainly, is a decadence of the mining industry. I have wondered, however, whether the condition in general is as much of a paralysis as some persons think. If we look at the statistics for gold and silver, copper, lead or zinc production, there does not seem to be any waning. The statisticians of 10 or 20 years hence, looking back at the present period and considering only the statistics, without any other information, will wonder what we were talking about. It seems that the apparent paralysis results to a considerable extent from a change of conditions, such change being due to improvements in our economic practice. In other words, is it not the tendency at the present time, if a new discovery of ore be made in a district even of first-class magnitude, for that district to become quickly a one-company camp? We have seen during recent years a number of new discoveries of the first order, such as the Miami district, and a number of important developments, as in the Ray and Chino districts. In all cases there has been none of the excitement nor the general

appearance of activity that we used to have at Leadville and Cripple Creek and other camps. That phenomenon was very striking in the case of Goldfield when the consolidation was made there. Immediately Goldfield became apparently a dead camp, although its production increased. The change was due to economy. Some five or six individual managements were wiped out; there was nothing for the teamsters to do because railways were put in, and mills were erected which enabled the producer to ship in the form of bullion rather than ore. There was no longer any litigation, so the lawyers had nothing to do; nor did the local assayers have any business, not any way after high grading was abolished. In this case, therefore, the apparent paralysis was really the result of economic benefit.

A. H. Cowles.—One of the reasons why we find fewer prospectors is that they do not always know what they are hunting for. I spent about a year in Mexico and saw prospectors who had picked out a little piece of ore worth \$10 or \$15, and did laborious work on the strength of that single assay. They dug holes 150 ft. where there was absolutely nothing; one bored into an apparent mass of obsidian, with the greatest confidence of finding ore. If the prospector had possessed the most meagre education in mineralogy he would not have spent his time and money in that place. The old prospector has, in modern times, been largely displaced by the skilled mining engineer. Then again, if a prospector nowadays discovers valuable ground he has to spend a lot of money before he can interest anyone; he must have ore blocked out and in sight.

A. H. Rogers.—Mr. Sharpless presented one very appropriate suggestion, namely, the administration of the Forestry Bureau. I believe an expression of the Society would be important. I would like to ask if any members know of any cases of incompetent classification, such as Mr. Sharpless mentioned in his remarks.

E. L. Dufourcq.—Speaking of the Forestry Bureau, I was not long ago called in to give my opinion as to the sequence of a valuable deposit; the Bureau had refused title for four consecutive years on a deposit in a fissure vein, not properly classified as a contact, where, if I remember rightly, some fifteen claims were in a straight line. About four of them had been opened by tunnels and drifts, showing a valuable copper deposit, and in the continuation along the outcrop, diamond drill holes and open cuts had showed iron pyrite with copper contents, but the Government claimed it was necessary to prove a valuable deposit. Now the necessary amount of work had been done on the claims to entitle the owner to patent. The

Government claimed he had not shown a valuable deposit on each claim, and they would not accept the analogy between the outcrop on the four or five claims where the outcrop showed copper, to prove a valuable ore deposit. There was no reason to believe that similar valuable outcrops would change in character in depth. It was only after four years, spent in diamond drill work on each claim, in the running of drifts, and the obtaining of an individual assay on each claim showing 6 per cent. ore, which assay had to be filed and sworn to, that title was issued. It seems absolutely ridiculous to issue title on the result of an individual assay which proved nothing, and to refuse patent on the result of the early diamond drill holes and the analogy of the ore on contiguous claims.

D. M. Riordan.—A number of reminiscences come to my mind which will perhaps throw some light on the paralysis of mining camps and the disappearance of the prospector. I will present these as they come to me, without regular order or sequence. In considering this subject it should be borne in mind that the country west of the Mississippi and east of the Sierras was, at the close of our civil war, a *terra incognita* to most of us. The first trans-continental railroad had been completed, having been pushed largely as a war measure. During the war a man could obtain the same rights by working on the railroad as by serving in the army. I served two enlistments in the war and then struck out for the West, before I was twenty. I was part of the great army turned loose after the war, accustomed to camp life, who did not want to settle down to their old occupations.

Most of the army men were a great deal like the men who overran California in the first two or three years after the discovery—they were anything but miners. I venture to say there are very few places in California today, in which either of the precious metals exist, that were not found within the first two years after the discoveries in California. When a man could not make from \$5 to \$20 a day where he was working, he would start off and look for something else. In that way every little streamlet, valley and even every mountain range was scoured. You will find on every side in California piles of boulders strung along the little gulches. They were moved there by hand, those being the days before dynamite or giant powder. If a prospector were to start out today as I started, he would find few places at which nobody had been before. After the silver discoveries in the Comstock, the discoveries of gold in the mountains, and the discoveries along the Fraser river, there was nothing left on this continent where there was an open road, except Alaska.

The prospector took chances which the professional man with a reputation to sustain would not take. The prospector paid no attention to the possibility of finding anything 100, 200 or 500 ft. below the surface; he was only concerned with physical evidence of the mineral. I worked as a miner on the Comstock in '69. I walked from Salt Lake City into the camp, where we had silver ore that ran \$22,000 to the ton. In those days you could locate a claim 600 by 1,500 ft. under the law, while ten feet away from you might be another fellow who had a hole down, with his location 600 by 1,500 feet.

In Bodie they had rich ores in the '60s. Somebody found a little quartz vein that justified going down by horse whim. This resulted in the development of the Standard mine. Adjoining was a mine called the Bodie, on which a shaft had been sunk 250 ft., close to the Standard line, which cut 17 veins showing ore running over \$18 a ton. On one of those veins, absolutely against orders, the night foremen drifted 18 ft.; the vein there was 9 ft. wide and the ore ran \$40,000 to the ton. I turned out \$1,000,000 with five stamps in six weeks.

E. L. Dufourcq.—Another thing that has some bearing on the change of conditions is the relative inability of the working man in the district to make a living. I have had this called to my attention especially in Colorado and Utah. In the last three or four years a great many men who formerly were prospectors, and would go out during the summer months, have now turned to land speculation, or rather to the cultivation of small orchards. The districts around Green River, in Utah, are being cultivated for farming, and where ten years ago you used to hear men discussing prospects, today they are talking about alfalfa, and potatoes and apples.

G.W. Gray.—If permissible I would like to recite one instance of what happened in Cornwall. The reason for the decay there is pretty clear. The price of both copper and tin went lower and lower, and as the mines got deeper the pumping charges became heavier and the costs higher, so that there are only two or three left in existence. Mr. Sharpless described pretty well the reasons why the mining industry decayed in some mining districts, but what we want to find out is how to get them back to life again. They have tried in recent years to reopen some of the older mines but have failed. Naturally, they took the mines which formerly made the largest profits, and proceeded to open them again. Those mines were the deepest and the most expensive to open. When they got to the bottom they expected that they would find the stopes all ready for them. The old miners told them of the ore blocked

out, but of course no ore at all was in sight because when the old owners saw that they were losing money, their first step was to shut off all development and take out the ore in place before closing the mine. The only chance the new operators had was to develop new ore, but in their years of work they had spent all their money. The only way to avoid these things in future is to keep more accurate records of work done. All one usually finds is an assay plan and an indication of widths, but never any description of ground gone through. Better records should be kept, not only of the surface work but an accurate description of all development work done; then when the mine is closed these records should be filed in some public office.

On the motion of Mr. Knox the meeting adjourned at 10.10 p. m.

L. D. HUNTOON,
Secretary of Section.

SAN FRANCISCO.

A meeting of the San Francisco section was held on Monday evening, Feb. 5, 1912, after dinner at the Palace Hotel.

The chairman, Prof. S. B. Christy, opened the meeting by referring to the communication respecting the proposed Panama-Pacific international engineering congress printed on another page of this bulletin, and stated that the chairman of the convention had been authorized to convey the communication to the several societies represented. The communication was thereupon read into the minutes of the meeting.

The Chairman.—This report was unanimously adopted by the convention, and it was understood that we were to do what we could to secure the support of the Society. I think it will be well for us to adopt this resolution as the sense of this meeting, and urge that it be adopted by the Society. Seven national societies were represented at the convention which endorsed this report. Others were present, but we decided that it was better to confine the meeting to national societies. The idea, of course, is not only to enlist our own national engineering societies, but to have them act as sponsors for all similar engineering societies in the world.

One plan submitted to us was to have a very strong local committee take charge of the whole affair, and work up a program, but on going into the matter carefully, we came to the conclusion that this would be a mistake. We had with us the secretary of the American Society of Mechanical Engineers, who gave us a good deal of good advice, on which we acted in draw-

ing up this report. The next step is to get all the national societies to approve the plan. The thing to do next is to get the promise of each society to hold the meeting here, if it accepts the general plan. The present committee still holds until this matter is settled, but as soon as it is arranged, this committee will make way for the permanent committee on congresses, which will be appointed to take charge of the program. The president of the Exposition appointed a committee which met with us; they could not promise anything except a building. They said an exposition building would be provided with accommodations for congress meetings. That was as far as they could go, but we have that assurance in writing.

Mr. Bain.—We shall have to raise money for any entertainment to be afforded, and any incidental expenses.

The Chairman.—We thought at first we would arrange these congresses to extend through the whole period, but if we did that, we would have to make excursion after excursion and entertain these visitors the whole year round. This would be impracticable. We decided finally it would be better to have them come in a group. The reason we want these societies as a whole to take part is because they have plenty of funds for the general work of the congress, leaving us only to provide for the local entertainment.

Mr. Bain.—I move that the report of this committee be approved, and that the Mining and Metallurgical Society be urged by the San Francisco section to take part in this congress.

Mr. Bain's motion, duly seconded, was carried unanimously.

Mr. Bain.—I would like to mention that a bill has been introduced into Congress by Mr. Raker of California, proposing to establish at Auburn, in Placer County, an experiment station; the bill is so worded that the station becomes practically a place for free assays. Personally I do not think there is any chance for this bill to pass, but the assayers in San Francisco are quite concerned over it, and have felt that a protest should be made. They held a meeting today, at which the reputable firms were represented; they prepared a resolution and asked me to submit it here, to learn whether we also felt like entering a protest. That, I think, is quite in keeping with what we have already done. You will remember that when the American Mining Congress was to meet in Los Angeles, in the fall of 1910, we appointed a committee to prepare resolutions on what we thought would be appropriate work for the Bureau of Mines. One of the things we resolved against strongly was any interference with private industries, that not being the function of

the Bureau of Mines. Since then the Society has debated on the proper function of the Bureau of Mines and has resolved that one of the fundamental principles should be no interference with private work. The particular resolution is as follows:

At a meeting of the assayers and metallurgists of San Francisco, held Feb. 5, 1912, the following resolution was unanimously adopted:

WHEREAS, a bill, H. R. No. 17,033, has been introduced by Mr. Raker of California into Congress and referred to H. C. on Mines and Mining, providing for the establishment of a government experiment station at Auburn County, California, at which assays, tests, analyses and miscellaneous investigations of minerals and metallurgical problems are to be made gratuitously, or for a nominal charge, and

WHEREAS, there already exist well established private plants where this work is adequately and economically done and which meet the existing conditions along these lines,

NOW THEREFORE BE IT RESOLVED that, while cordially approving of well directed efforts on behalf of the Government in the advancement of science, we protest against any unnecessary interference with established industry and personal initiative and against this bill in particular, as an unwarranted and unwise incursion into the field of established business.

BE IT ALSO RESOLVED that copies of this resolution be sent to Congress, to the press and to the interested technical societies.

I submit that to the section. My own feeling is that it would be proper for us to endorse some similar resolution.

Prof. Newsom.—It seems to me, if we join any protest at all, it ought not to be this protest, which directly interested assayers have brought forward, but one based on the broad ground of impracticability.

Mr. Bain.—How would it do to call the attention of the council of the Society to this bill, as proposed legislation contrary to the resolution already adopted by the Society in connection with the Bureau of Mines. The Society as a whole, as well as its individual sections, is on record as strongly opposed to the Bureau of Mines doing any private work of this sort.

A motion to this effect by Mr. Sizer, duly seconded, was unanimously carried.

Mr. Bain.—I would like to explain that the difference between our action and that of these assayers is that any action they take will be more or less discounted because their own bread and butter is concerned, while with us it is professional interest. The effectiveness of a resolution coming from California will be greater than any general action, because this bill was introduced by a Californian.

Mr. Hersam.—It is bad policy for assayers of ore to obtain

government sanction without specifying how the sample was taken. If such things are to be authorized by the Government, supervision must go back to the very taking of the sample; otherwise the whole scheme is improper from an engineering standpoint.

The Chairman.—I am very glad to be able to say that Mr. Requa, whom we hoped to have with us, is much improved. It might be a graceful tribute to him if we were to offer our congratulations on his safe survival through a capital operation.

Mr. Bain.—I move that the chairman be instructed to send our congratulations to Mr. Requa.

Mr. Bain's motion, duly seconded, was carried unanimously.

The Chairman.—Mr. Requa has been very active as member of a committee of the Society appointed to consider a revision of the mining laws of the United States. He has received a large number of letters which he has turned over to Mr. Bain to classify. If Mr. Bain is prepared, we should like to have him give us a brief summary of these letters.

Mr. Bain.—In a general letter, Mr. Winchell asks for expressions of opinion regarding four things:

1. Classification of lands, and segregation by the Government of all minerals from surface rights.
2. Nature of the possessory right. How shall mining rights be initiated? How should they be perpetuated, and how terminated?
3. Shall mineral lands be permanently alienated or leased? Do you advocate different provisions for the precious metals or shall coal, iron ore, petroleum and other minerals be treated alike?
4. If the present system of alienation of title is retained, shall we keep the extralateral right principle?

In response to these questions, up to the time that these letters were sent me, some 50 or 60 replies had been received. Some of them it is difficult to classify, for the reason that the questions were misunderstood, and the answer does not squarely cover them. On the one question which everybody seems to have understood thoroughly—that relating to extra-lateral rights—there were only two who expressed a favorable opinion, and 44 who expressed decided opinions against it. Everybody thought sharply one way or the other on that question. As to whether the public lands should be classified with the mineral right separated from the surface right, it was not possible to make an absolutely clear yes or no division. First, with regard

to the classification of public lands, 24 were in favor of classification and three were opposed. As to the question of separating surface from other rights, 21 were in favor of separating surface rights from mineral rights, and nine opposed. With regard to the possessory right, and how it should be initiated and retained, there is no consensus of opinion in a broad way as to whether there should be a change or not. In a general way, apparently, the opinion is that if any change is made it should not be a very marked one. It seems to be the idea that the general principle of staking out lands and working them should be maintained. There is some sentiment to the effect that a more stringent provision for retaining possession should be enacted. One of the surprising things to me was the difference of opinion on the question as to whether land should be permanently alienated or should be leased. On that question there were 26 in favor of leasing and 15 opposed. In other words, of those who took the trouble to answer, two-thirds are in favor of some form of leasing. Few persons paid any attention to the question as to whether there should be separate laws for coal and iron as distinct from gold and silver. The question was: "Do you advocate different provisions for the precious metals, or shall coal, iron ore and petroleum and other minerals be treated alike?" Only two were favorable to a general law covering all the metals, and 16 were in favor of some separate law for the different ones. It is very curious to see how the writers are influenced by what they have done. The coal and iron men of the East see no trouble at all in the leasing system, but the gold and silver men, especially those who have been quartz miners, think that the old-fashioned law is the only one that can possibly be made to work. So apparently there is room for a good deal more expression of opinion.

The extra-lateral right was voted down, practically unanimously and nearly every one, who has had experience in Mexico, Australia or South Africa, finds things to commend in the laws of those countries, as opposed to ours. That is, those who have had actual experience under other systems are by no means sure that our system is the best one. It is those who have not had any foreign experience who think our law offers the only possible arrangement.

Mr. Bradley.—Probably Mr. Callahan could tell us something about the Australian laws.

Mr. Callahan.—In Australia, whatever revenue comes from royalty or leasing goes back to the district itself. The government appropriates this money for roads or hospitals, keeping an account and appropriating it to the district. Thus there are

no taxes to pay, as expenses are provided for from royalties. A leasing system is in perpetuity or so long as you are actively at work; but if you abandon a claim for three days, it is forfeited. The miner takes up 24 acres and must work with five men for this area, but the warden has discretionary powers. Suppose a prospector has worked two men for six months, and at the end of that time gives the warden an accounting for what he has done. The warden may say, "I will give you an exemption for six months." The idea in Australia is to dig or get off the ground. The law is severe but it works well. Australia is as large as the United States, but there never was one mining lawsuit that I know of. There have been contests for adjudication by the officials, for when you stake out a claim you go before the warden, he sends out a surveyor at a nominal charge, and you get your ground. The warden decides any dispute and that forestalls lawsuits. The claim may be any shape, usually about 1,500 ft. long by 700 ft. wide. But the law does not allow you to work the underlie. There is no limit to the number of claims, provided you find mineral in place on every one. If five or six claims are connected with one another, work on one claim counts for all.

In order to explore deep deposits, you are required to take up additional ground, or buy it. You can take a prospecting area there, and the government will sink a shaft for you. If you do not want a vertical shaft, then you may work through an inclined shaft.

Mr. Starr.—In the case of a discovery of ore 2,000 ft. below surface, what would one do to maintain that prospecting area meantime?

Mr. Callahan.—The warden will tell you what you have to do.

Mr. Sizer.—Can you make an underground discovery?

Mr. Callahan.—It is possible to make an underground discovery. In the case of deposits which have no outcrop, to which you would have to drive a tunnel perhaps several thousand feet, the government will sometimes bore for you, or it will assist you in bearing the expense. In case you wish to put down a bore for prospecting an area, you tell the warden what you are going to do and you are protected in doing it. A reasonable time is allowed, and nobody else is allowed to go into the ground. You are allowed to take up any number of full claims that you wish, for which you pay \$25 a year rental and 10 per cent. upon your gross output. That money all comes back to you in hospital funds, in road improvement, and in other ways. For instance,

if the district should decide that it wanted one prospecting shaft to demonstrate what it ought to do, the state perhaps appropriates enough money, within the fund, to sink a shaft. They do that in a number of cases that are beyond private enterprise, thus doing what corporations are afraid to do.

The Chairman.—It seems to me that it might be well for us to suggest to Mr. Requa that similar inquiries be sent to some of the officials and mine operators in Australia, South Africa and Mexico, for their opinions as to whether the laws in these various countries operate to the best advantage of mining or not, and I think we might well include those countries in our inquiry. From what I have heard, the laws of Mexico seem particularly open to favorable comment, and some of these suggestions we have had tonight from Australia might be used to advantage, particularly the spending of state money in the district.

Mr. Callahan.—The Mexican law requires you to pay a rental to the government of \$100 a year. Australia looks at it this way: A lot of young men are growing up. Their energy is what you want. It is the young fellow who finds mines; nine-tenths of the mines of the world are found by people who know nothing about the business. The government does not want to close up the mines; \$100 is no compensation for the government to tie up something that may be developed later by somebody else. The idea is that if a man does not want to dig, let him get off the ground and give the other fellow a chance. California could produce twice as much gold as she does if she would eliminate a lot of these old locations. I have been mining in California for over 40 years, and all over Nevada, and I warrant that I could go back to those old camps and find operators who claim titles to locations dating from 1868, say, along the Mother Lode, and in 10 days you could duplicate the work on the whole claim. The idea in Australia is to get the young fellow on the ground, give him a chance, and get the work done. What the government gets in the shape of taxes is as nothing compared to the development of the territory. If in the United States that money were spent in the district it would be different, but it all goes to Washington; it never comes back, and the piece of ground is tied up.

I think the Australian mining law is excellent. It is the most severe, but it is the best, after all, for the young fellow who wants to work. For mining companies it is also good because it eliminates the lawyer, and my experience in mining is that the lawyer gets away with about 20 per cent. of the profit.

Mr. Bradley.—Mr. Callahan spoke of the freedom from

litigation under Australian laws. Isn't that because of the difference in the general laws of the English government and of our own?

Mr. Callahan.—I think it is because in securing the title the boundaries are established; this is done by a surveyor. All the surveyors in the district work for the warden, but they are allowed a certain mileage, and a certain fee.

Mr. Mein.—I know of no case in South Africa where a suit has been begun between two companies.

Mr. Callahan.—The only objections that arise are those made by a man's neighbors on the adjoining ground in the district. A notice is put up showing exactly what this man applies for. If anybody in the district asserts that the man should do more work, he can appear before the warden, and the people in the district can agree that the man is not doing enough for his claim. If there are no objections to the man's application for exemption, the warden can use his discretion. In some cases they even allow exemptions for two or three years. In the case of mining companies, which spend fifty or sixty thousand pounds in some cases, while they are reorganizing, it may be necessary to give longer extensions of time.

Mr. Bain.—Mr. Requa has the matter in mind, but it seems to me that the San Francisco section might very well take the lead in drawing up principles on which proper laws governing oil lands should be framed, since the largest oil wells on public lands are in California.

The Chairman.—The question of deep placers is also a very important matter. The law provides at present that oil mines are to be classified as placer mines. If there is no objection it will be understood that we will request Mr. Requa to prepare a draft of a law governing oil lands, for presentation at the next meeting.

Mr. Bain.—Suppose we ask somebody else to take up the deep placer mining problem, so as to have two definite reports.

Prof. Newsom.—Oil and placer gold are very different in their formation and mode of occurrence; also in the features which lead to discovery and working, and in their habits, oil being a liquid which may migrate, placers remaining fixed. There ought to be separate laws covering those two classes of deposits.

Mr. Bain.—I move that the chairman appoint two committees to outline the principles which should underlie the laws governing petroleum fields and deep placer mines.

The motion, duly seconded, was unanimously carried. The chairman then appointed Mr. Requa chairman of the oil committee and Mr. Newsom chairman of the committee on placers, with power to add to those committees as they see fit.

The Chairman.—I have great pleasure in seeing Prof. Newsom present with us. He has just returned from South America and has told me that he was much interested in observing some deposits of saltpeter there. This is a subject in which we are much interested because we hope to find deposits of the same sort in our own arid region. While he has had no time to prepare a discourse, he will be able to interest us with an account of his experiences.

Chilean Nitrate Deposits.

By J. F. Newsom.

During the last few months I had occasion to make a trip through some of the Chilean nitrate country, and I was very much interested in the occurrence of the material, and in the magnitude of the industry. I doubt if many of us realize how large the nitrate industry of Chile is. The production of nitrate last year in that country was valued, on the Chile coast, at about \$100,000,000, and of that production the United States consumed about \$20,000,000 worth. That equals about the amount we are paying to Germany for potash. These figures give us some idea of the magnitude of the industry. It is the largest mining industry on the South American continent, and I think, will remain so for many years.

You may be interested somewhat in the location and the occurrence of the nitrate, and possibly also in the way it is worked. The nitrate fields extend from about 19 deg. south latitude, southward for a distance of about 500 miles along the west coast, and throughout this area the nitrate fields are more or less continuous. The fields are not entirely continuous; the deposits are usually more or less "patchy," with barren areas, or areas too low grade to work, scattered through them.

Most of my remarks about the mode of occurrence and character of the deposits will apply particularly to the northernmost, and thus far the most important one of the nitrate fields or "pampas," as they are called, namely, the Tamargal pampa; but the general conditions, mode of occurrence, etc., are somewhat similar in all the fields.

The deposits generally occupy a comparatively narrow strip; in some places they are only a few hundred yards wide, in other places a mile wide from east to west, in other places three, four

or five miles. The country in which they occur is the extremely arid portion of the west coast.

As to topography, if you imagine our California coast elevated about 5,000 ft., with the Sacramento and San Joaquin valleys forming a plateau four or five thousand feet above sea level, with the coast range peaks extending for some 2,000 ft. above that plateau, and then the Sierras, a volcanic range like the Andes, to the east of the nitrate fields, the peaks rising 18,000 to 22,000 ft., you have the general topographical conditions that exist along the west coast in the nitrate region of Chile. There is always the interior valley running parallel and from 15 to 20 miles back from the coast, and that interior valley is often as flat as the Sacramento or San Joaquin valleys; it forms the elevated pampa, ranging in width from 15 up to 40 miles before you reach the west slope of the west range of the Andes, which is a volcanic range. It is usually at the west side of this pampa, not in the flat pampa itself, but on the foothills that correspond with the foothills at the west side of the Sacramento and San Joaquin valleys, and on the slopes of these first gentle hills that rise up to the coast range, that the nitrate deposits occur. They do not occur down in the flat, though these places often contain a heavy salt deposit.

It seldom rains in this district, and when it does the rains are not very heavy. But it is quite foggy; the fogs drift in from the sea very much as the fogs drift in along our own coast. These fogs drift over the coast range and down across the pampas, so that, while there is no rain, the surface of the ground often becomes quite wet. I mention that because it may have something to do with the collection and formation of the nitrate deposits.

The rocks forming the coast range are both sedimentary and igneous; the sedimentaries are generally considerably metamorphosed. The nitrate deposits themselves are rather queer in their occurrence, and one could often walk over them for miles, if they were not pointed out, without recognizing the presence of anything valuable. The nitrate rock occurs usually as a brown or gray deposit, where it is not very pure. Where it is pure, it is usually white, sometimes pink, and resembles ordinary salt. Ordinarily, however, the "caliche," the name given to the nitrate bed that is mined, is composed of pebbles (if there happened to be pebbles in the original surface) of sand, angular debris, or whatever the original surface was, firmly bound together by the salt which has infiltrated, forming a hard conglomerate. If you examine the caliche you will notice often that the pebbles or rock fragments are entirely separated one from the other, having been forced apart by the deposition of the

nitrate in their interstices. It is apparent that the material was carried into the original loose surface materials in solution, and was deposited, probably owing to the evaporation of the solutions. I think it probable that the solutions were brought in by capillary attraction and that evaporation followed, the salt being left, much as our alkalis are formed in the west.

The deposits are always very close to the surface. Usually there is from two or three inches up to a foot of dust and sand over the surface. Then there will be, say, a foot or possibly four or five feet of low-grade caliche, carrying perhaps from five or six up to 10 or 12 per cent. of sodium nitrate; below that comes from one to five feet of the higher-grade material, running from 18 to 25, and sometimes even as high as 50 or 60 per cent. of sodium nitrate. The ordinary grade of the rock that is mined is from 20 to 30 per cent.

The mining method is a very simple one; it is an open-cut process, in which the faces are carried forward in more or less regular lines, the waste material being stacked up on the worked-out areas. Drill holes of about 6 in. diameter are put down by hand to the bottom of the caliche, at intervals of 30 to 40 ft. in front of the working faces. (I should mention that when the caliche is passed through, usually the underlying gravel or debris, or whatever the material below, is practically barren of nitrate of soda or any other salt.) The drill holes are charged with black powder; the blasts shatter the deposits so that they can be further broken up by hand hammers and then hand picked. A low-grade black powder, made very cheaply at the works from sodium nitrate, sulphur and coal, is used.

After the deposits are broken up by the blasting, the workmen further break it up with hammers into pieces that they can conveniently load into carts. The low-grade material is left on the ground, and the workable grade is loaded into carts, by which it is hauled to the works, or is taken by the carts to trains of ore cars by which it is transported to the treatment plants.

The process of extraction is a comparatively simple one. The coarse, hand-picked rock is taken to the nitrate works, or "oficinas," is run through crushers, and crushed coarse. The material comes from the crushers in sizes varying from a fraction of an inch up to three or four inches in diameter. This material, as it comes from the crushers, coarse and fine together, is charged into the leaching vats and water is turned on. This is heated to boiling, and left boiling for three or four hours, until it reaches a certain degree of saturation, when it is drawn off and run into the precipitation vats; then other weaker solutions are run through, the last wash, before the charge is drawn from

the leaching vats and taken to the tailing heaps, being the weakest solution of all. The solution from the second, third and fourth washings are run on to other charges, their degree of saturation being gradually increased before they are finally brought up to the requisite strength to be drawn into the precipitation vats. In other words, the leaching vats are run in series, usually of four or six, the fresh water being always brought into the vat where the charge is most completely leached, thence passing at intervals through all the vats, until it is finally used on the vat last charged, whence it goes to the precipitation vats. The strong solutions are drawn off into large vats and simply allowed to stand for four or five days, when the sodium nitrate precipitates out as a white or brownish white salt. If the salt carries less than 95 per cent. nitrate of soda, a penalty is attached in the market.

The chief impurity is common salt. There is a great deal of sodium chloride in all of the nitrate deposits. The key to the process of extraction lies in the fact that hot water will not hold much more common salt in solution than cold water, but as the water is heated, its ability to dissolve sodium nitrate becomes greatly increased; when this heated and saturated solution is allowed to cool down, the sodium nitrate precipitates out, but the common salt remains in, and the solution can then be used again.

The waste material, after having been leached, is shoveled from the vats. Most of this is done by hand labor; very few labor saving devices are used. The material is shoveled out and hauled to the waste heaps.

After the nitrate has precipitated in the precipitation vats, it is shoveled out on to the drying floors, allowed to dry for several days, then sacked and shipped off to the coast by rail. It is there loaded into sailing vessels chiefly, and goes to all parts of the world.

The sodium nitrate can be produced very cheaply. One of the principal items in the cost of production is the government export tax, which is about 56c. a Spanish quintal (practically 102 lbs.). From this export tax, of about 50c. per 100 lbs. on all this material that is produced and shipped away from the country, the Chilean government gets most of its revenue.

A number of theories are advanced as to the origin of the nitrate deposits. One is that the inland basin, which would correspond to our Sacramento and San Joaquin valleys, and around the rim of which the deposits occur, was originally an inland sea, that it evaporated, and that the nitrate is the residue which has collected along the rim of this sea. One objection to this theory, as applied to the "Tamargal" pampa, one of the

greatest of the nitrate pampas, and one which certainly has the appearance of an old dried-up lake bed, is that the nitrate deposits are found only on one of its sides, namely, the west side. If the deposits were formed by the drying of a body of water, they certainly should have been formed around the entire margin of that body. They occur on the west side, towards the coast, and not on the Andean side.

Another theory that has been advanced is that at the time the land was lower, and formed the Pacific shore line, the sea-birds, of which there are a great number along the coast, formed guano deposits, and that these deposits were afterwards dissolved and redeposited in their present form.

Another theory is that the deposits have been formed by winds blowing guano from the coast, over the coast range, and to its collecting along this eastern slope where the deposits are now found.

Another theory is a bacteriological one. It is that the nitrate of soda was deposited by bacteria in the same way that nitrogen is deposited on the roots of clover and alfalfa, and the other legumes. With the exception of the life existing on the pampas, owing to the exploitations of the nitrates, those pampas are absolutely devoid of life of any kind, and it is difficult to reconcile this condition with the idea of bacteria forming these enormous deposits.

In going over nitrate fields I was impressed with the fact that they occur in the neighborhood of very extensive volcanic regions; some of the volcanoes are active at present, and they have all been active at no very distant period, geologically speaking. Up in the Andes, along the portion of the range where the nitrates occur, there are extensive deposits of borax. These, in all probability, came from volcanic emanations, or the leaching of volcanic rocks, and it occurs to me that the original source of the sodium nitrates that are at present found down in the pampas may have been in the gases emanating from the volcanoes, or in the volcanic rocks of the west range of the Andes, and that the nitrates being very soluble, may have been carried down to the pampas by the water passing off from the west slope of the Andes, either as surface or underground waters.

There is little doubt that the nitrates were carried to their present position, in solution, that these solutions were brought near to the surface by capillary attraction, and that the nitrates were deposited owing to evaporation of the solutions near the surface. Considerable migration in the material could be brought about in this way. The difficult thing to understand, however, is the original source of the nitrate. That this source was the volcanoes of the west range of the Andes seems to me likely.

One objection to this idea is found in the fact that on the largest one of the nitrate fields thus far worked, the deposits occur, not at the edge of the plain which borders the foot of the Andes, but at its opposite edge—furthest removed from that range. It is possible, however, that underground waters coming down from the high range would have prevented the formation of the deposits at the foot of the mountains.

Much work would have to be done, and many data collected, relative to the composition of the rocks, volcanic emanations, and waters of the west range of the Andes, to prove or disprove the hypothesis outlined. Thus far the question of the origin of the deposits has not been satisfactorily solved. It looks simple at first, but has proved difficult. It is an important problem, and one which will take much careful work to solve.

You may be interested in a brief account of some labor troubles that occurred in one of the most important of the nitrate fields a few years ago. While the Chilean laborers are fairly good workmen, they do not place a high value on human life. Their favorite weapon is the knife. A few years ago, owing to some grievance, a large number of the workmen in the most important nitrate field of the country went on strike. The trouble culminated in the chief nitrate town of the country at that time, the town of Iquique, a town of about 30,000 people. More or less property was destroyed, some of the nitrate plants were compelled to shut down, and there was considerable rioting. The situation became critical, especially in the town of Iquique, where the government took steps to quell the disturbance and set things right.

The commander of a Chilean war vessel lying in the harbor was ordered to land a company of marines and take charge of the situation. The rioters had collected in large numbers in one of the squares of the town, and the commander with his marines went to this place and ordered them to disband and to go quietly to their homes and back to work, which they refused to do. He then ordered the marines to fire over the rioters' heads, but they still refused to disband. At this point the marines swept the square with a gatling gun, and several hundred of the strikers were killed in a few moments. This drastic move effectually stopped the disturbance, and owing to the character of the rioters, doubtless saved many more lives than were lost in it, and saved much property.

The government's attitude was impelled by two factors, namely, to preserve order, and further to prevent interference with its chief mining industry, which was also its great source of revenue.

Mr. Mein.—How are the deposits drilled for blasting, and about what are the losses in mining?

Prof. Newsom.—The holes are drilled by hand. Holes of about 6 in. in diameter are put down through the caliche and into the barren material below, where they are hollowed out, and several sacks of powder are put in. Then the whole thing is blown up, the rich nitrate and the low-grade material being mixed up more or less together. It is then broken by hammers, and the rock for treatment is sorted out by hand. I cannot state definitely what the loss of workable caliche is in this operation, but I should say that it is probably around 15 to 25 per cent.

Mr. Bradley.—About what grade do they discard?

Prof. Newsom.—The lowest grade rock that they have ever worked successfully, so far as I know, is about 14 per cent., but ordinarily they do not work anything less than 16 or 18 per cent.

Mr. Bradley.—Could you state what happens after a district is worked out?

Prof. Newsom.—Some of the deposits have been worked as many as three times, where they began long ago, and originally worked rock that ran 40 or 50 per cent. Then they improved methods somewhat, and worked over the same ground again taking the material that would run from 20 to 25 per cent.; now they are working some of those grounds again and using material that runs 15 per cent., and practically cleaning up the whole deposit.

Mr. Bradley.—What I mean was this: After a period of twenty years or so does there seem to be any regeneration?

Prof. Newsom.—I cannot answer that question definitely. While I was in the fields I tried to get information particularly on that point; some nitrate men who had been there a long while think that the material is still depositing. Others think that it is not, but these were merely opinions; I could not get positive data on the point.

Mr. Sizer.—Is there any evidence that volcanic action destroyed the eastern rim of the supposed inland sea? You said one difficulty of that theory of formation was that the deposits were along only one rim. Couldn't that volcanic uplift have destroyed the other rim?

Prof. Newsom.—I think the deposits are unquestionably subsequent to the volcanoes; the deposits on the east rim might have been removed by water, but I think not by the volcanic uplift. It rains and snows along the west slope of the Andes. The rains do not come down as low as the pampas, but the waters from the rains along the west slope might have come down and leached this material out from the original deposit on the east side of this basin.

Mr. Sizer.—Can you state whether there is a little drainage, a very small drainage, from the mountains to the rim where the nitrate is found?

Prof. Newsom.—No, not surface drainage; probably there is underground drainage.

Mr. Hersam.—Is any phosphate associated with this nitrate?

Prof. Newsom.—No, not so far as I know.

Mr. Bradley.—Is anything known about the thickness of the barren rock below the nitrate beds?

Prof. Newsom.—It goes down very deep; in some places where these rocks extend out on to the fringe of the pampa, which is filled in much as the Sacramento valley is, they are known to go down several hundred feet. Some of the nitrate plants get their water supply from the valleys; they go down four to six hundred feet without finding any nitrate.

The bed rock may be shale or limestone, or any rock that may have outcropped there. Of course in that case the nitrates will be in the interstices of the debris derived from these rocks, and in some cases it is found in the joint and bedding planes of the rocks themselves in the weathered up-turned edges of those rocks.

Mr. Read.—Is the line of separation between the deposit and the underlying rock a distinct one?

Prof. Newsom.—Generally so, yes.

Mr. Mein.—What does the one hundred million dollar output represent?

Prof. Newsom.—The output of Chile in 1911 was about 2,400,000 long tons of nitrate. From the raw material an average extraction of probably 15 per cent. was obtained. That would make about 16,000,000 tons of raw material treated. The average price last year was about 7s. per 100 lbs. on the Chilean coast, including the 2s. of government excise.

Mr. Read.—What proportion of the nitrate is recovered by their processes?

Prof. Newsom.—The loss will be, say, from 15 to 30 per cent. of the nitrate in the material treated in the plants.

The Chairman.—You say there is absolutely no life there at all?

Prof. Newsom.—Absolutely none.

The Chairman.—Is there a moss or anything of that kind?

Prof. Newsom.—Nothing that you can see at all.

The Chairman.—Even when you burn the soil you find no organic matter?

Prof. Newsom.—No, not so far as I know.

The Chairman.—It seems almost impossible to understand that absence of nitrogenous matter in the rock, unless it may be that a condition exists in which the nitrogen of the air may become fixed.

Prof. Newsom.—They say, though I did not notice it, that at certain seasons of the year, there is a great deal of static electricity in the air on account of the strong winds and the extremely dry climate. It may be that the nitrogen of the air is thereby fixed in some way, that it collects at the surface, and that the moisture carried over in the dense fogs which I have mentioned carries it down into the rocks. You would think, however, on that assumption, that the rich rock would be nearer the surface. As a matter of fact, it occurs just the other way.

The Chairman.—Could the eastern rim have been carried away?

Prof. Newsom.—I don't think so. It is more likely, if nitrate was ever deposited there, that it has been carried away by the drainage from the mountains, because it does snow and rain up in those high altitudes.

The Chairman.—It would take a very great precipitation in the high mountains to wash away the eastern boundaries. I think this occurrence is one of the geological problems of the age.

Prof. Newsom.—It really is a big problem, and one that should have been solved a long time ago, but it will require much careful work, not only in the nitrate fields themselves.

but all around through that country. I believe the causes for those deposits are probably to be found some distance from the deposits themselves.

Mr. Starr.—What proportion is left unworked in those 400 miles?

Prof. Newsom.—The proportion is unknown. Great areas have not been prospected, and no one knows what they contain. The areas that have been prospected show tremendous quantities of the material, and at the present rate of working, I believe they figure out something like 100 years' supply. I am not positive on those figures, but it is a very large supply.

Mr. Starr.—What is the condition under which that land is taken up?

Prof. Newsom.—The land is owned either by private individuals or by the government; all of it that is not owned by private individuals or companies to which title has been granted, is retained by the government. In the tracts of land to which the titles are in doubt, the respective owners are having great trouble proving their titles, something after the fashion of our oil lands. The policy of the government is to retain all of these lands from now on. They began this policy some years ago when they found out what a monopoly they had, and they began to examine their lands. The government does that carefully. In making their examinations, the method is to go over the land and drill holes at the corners of 300-ft. squares; they then take samples from these holes and assay them. They figure the recoverable content of nitrate in any given property, publish the results, and then, from time to time, they put these properties up at auction. They send notifications to the United States, Germany, France and to Great Britain several months beforehand, concerning the locations, estimated nitrate contents, and dates the lands are to be sold. They place a minimum value per quintal on the recoverable nitrate in the lands; this minimum price is usually from three to five cents per quintal, depending on the grade of the material that they are offering. They sell for as much more than the fixed minimum price as they can get. A company securing lands from the government gets absolute title, but pays for the nitrate that is in the ground. The government gets that lump sum, and then thereafter it also collects a good tax for all the nitrate produced.

Mr. Callahan.—That is a case in which the foreigner does pay the taxes?

Prof. Newsom.—The foreigner pays the tax. There is this

feature about it, however: the government is in quite a controlling position there. It can control the industry, and can guard it against competition. If the electrical manufacturer of nitrate becomes a serious competitor, it can take off part of this tax and beat any mechanical or any electrical process that has thus far been brought forward, so that the government really has a very strong position for controlling and protecting the industry as it exists there.

The Chairman.—One thing that struck me very forcibly is the fact that at first sight it is difficult to recognize the occurrence of this material on virgin soil. Have you ever seen any occurrence in the West here that simulates the conditions there?

Prof. Newsom.—No, I have not, but I might have walked over any quantity of it, as any of us might, and never had any suspicion of its existence. That is one thing that raises a good deal of hope of our finding nitrates in some of our country in the West. I am quite sure that we might have large and important deposits of it without its being found by our prospectors. If their attention were called to the material at all, they would probably break a piece of it open with a hammer, and touch their tongues to it, and say "That is salt," and let it go at that. Usually salt is mixed in with it, and usually there is not enough of the nitrate to give the peculiar nitrate taste. If the richer rock is powdered and sprinkled on tinder, or a live coal, it burns rapidly, and those working the deposits get so that they can tell very closely the grade of the rock by that simple test.

Prof. Clevenger.—When was the process they are using in Chile developed?

Prof. Newsom.—The process was developed in almost all its lines some 30 years ago. It has been changed very little. At first sight the entire process strikes one as susceptible of much improvement. We cannot tell, however, just where labor-saving devices could be used in a country like that, where labor is comparatively cheap and not skilled. But very little systematic experimenting has been done, on any large scale, to increase the extraction.

Mr. Mein.—Ten per cent. in the tailings would contain 200 lbs. per ton and would be worth \$3.50 per ton.

Prof. Newsom.—The tailings won't generally contain 10 per cent. Their content will run, say from 5 to 8 per cent. Say the original rock carries 20 per cent., and a 15-per cent. extrac-

tion is made. This would leave 5 per cent. in the waste, but it would be 25 per cent. on the original nitrate.

The Chairman.—The greater loss would be on the stuff running less than 20 per cent., which they do not work at all.

Prof. Newsom.—That is discarded as waste in mining.

The Chairman.—Is water pretty expensive there?

Prof. Newsom.—Water is very expensive in a good many fields, but in some fields they get a good water supply from wells within a mile or two of the property; in such cases the water is not unduly expensive. In other fields, where it has to be brought long distances, the cost of water will run very high. Fuel also is expensive.

Mr. Hersam.—Does this rock disintegrate entirely during the process, or is it still lumpy?

Prof. Newsom.—It is still lumpy. It comes out with a good deal of mud and muck that is completely disintegrated, so that when it is dumped on the waste heaps it runs down a mixture of mud and these original lumps, somewhat like a thick slag, and then when it dries out it solidifies into a solid rock mass. These old tailing heaps can be mined rather easily by putting in big blasts to shatter them. Some of them have been re-treated.

Prof. Clevenger.—Does that material leach like sand in the cyanide process, or is the water run into the vats drawn off at the top and allowed to settle?

Prof. Newsom.—The vats are about 6 ft. wide, 8 ft. deep and 15 ft. long; they contain a coil of steam pipes going around the bottom and extending up 5 ft. from the bottom. The rock is dumped in and the water is turned on; it is boiled and then drawn off from the bottom. The tanks are run in batteries, usually of four. There is a false bottom in the tank.

Mr. Sizer.—What do the prospectors look for in hunting for the deposits? Do they look for salt?

Prof. Newsom.—There is no certain surface indication; they put down small holes with a hand drill, and test the drillings. They do the prospecting very systematically. They have to, because without drilling holes they cannot tell where it will be.

Mr. Sizer.—Do they use a jumper drill?

Prof. Newsom.—Yes; drills such as stone masons use; drills six or eight feet long are often used.

Mr. Bain.—What is the government doing down there in the way of geological surveying.

Prof. Newsom.—Nothing; they have not done any geological survey work in the nitrate fields. They have a department which has charge of this nitrate business, and keeps a lot of examining engineers employed; they examine the various fields and tracts of land very systematically, and keep well in advance of development, but, as for making geological studies, they have not done it.

The Chairman.—Have they prospected the interior of that valley?

Prof. Newsom.—They have put down water wells in various places in it, enough to know pretty well that there is nothing there. There is water in a great many places, but in some places there is none.

The Chairman.—Does the water contain nitrates?

Prof. Newsom.—Very little. This valley that I speak of, which corresponds to our Sacramento and San Joaquin valleys, is not a continuous valley throughout its whole distance, but it is rather a succession of valleys, end to end.

The Chairman.—I would like to call for a vote of thanks to Professor Newsom for his talk. I am sure we are very much indebted to him.

A vote of thanks, duly seconded, was unanimously carried.

It was then moved, seconded and carried that adjournment be taken subject to the call of the chair.

H. FOSTER BAIN,
Secretary of Section.

COMMUNICATIONS.

Memorial and report of convention of delegates held in San Francisco, January 15, 1912, to formulate plans for holding an International Engineering Congress in connection with the Panama Pacific International Exposition in 1915.

To the:

American Society of Civil Engineers,
American Institute of Mining Engineers,
American Society of Mechanical Engineers,
American Institute of Electrical Engineers,
American Society of Naval Architects and Marine Engineers,
American Society for Testing Materials,
Mining and Metallurgical Society of America.

Among the great engineering feats that have characterized the last century and the years of the present thus far run, there is nothing that approaches in magnitude and boldness the construction of the Panama canal. When completed and in operation its effect on travel, commerce and navigation will be profound. As a factor in determining the character of the advance in civilization during the twentieth century, its influence cannot now be measured, but its potential importance is entering into all the arrangements for future commerce.

It is a signal honor for the United States of America that it has been permitted to serve as the instrument by which this great engineering work is to be accomplished. Perhaps in no other way could this nation have more significantly impressed its character on a work of world wide importance.

In this great achievement, no class in this country is more interested than engineers, proud of the men in their profession who are bringing this great enterprise to a successful completion.

The determination to hold on the Pacific Coast an International Exposition to celebrate the joining of the two great oceans has brought to the engineers of the west a stimulating sense of the importance of the work of the engineer as a factor in carrying forward the march of civilization, and mindful of the inspiration and professional uplift to be derived from a concourse of engineers drawn from all parts of the world to one place and animated by one common purpose, they have committed themselves to the undertaking of bringing to the scene of this cele-

bration, representative engineers from the great engineering associations of the world in an International Engineering Congress to be held in San Francisco, during the course of the Exposition.

In the full realization that this can be accomplished only through the various national societies, acting in coöperation toward such an end, the representatives of such societies in convention here assembled, beg to report with specific recommendations attached, such general plan of organization and management as seems best suited to accomplish the purposes in view.

General Outline.—The type of International Engineering Congress which this convention desires to recommend to the consideration of the national engineering societies which it here represents, may be viewed primarily as a series of meetings of the various American national societies with the participation or coöperation of foreign societies of similar standing, held in one place and with such relation or sequence in time as may best serve the convenience of those desiring to attend.

This type of Congress we believe to be the simplest in organization and the most practicable in its relation to the various interests involved. It will secure flexibility of general organization and, to the participating societies, the largest possible independence and responsibility, each in its own field of work.

Having in view a Congress of this type the part which would be taken by each national society in its individual capacity may be outlined as follows:

It will issue in its own name invitations to the foreign societies with which it is most closely affiliated and will be primarily responsible for the duties of host to such as may accept. At the same time such invitation might naturally be supplemented, should the inviting society so desire, by a further official or formal invitation from the Exposition authorities through their special Committee on Congresses.

It will in a similar manner invite, as it may desire, specially eminent foreign engineers to read papers or to take part in the proceedings.

It will be responsible for the procuring of papers, their examination, acceptance, translation where necessary, and printing previous to reading. In this manner each society, acting for itself and in its own field, will assume full responsibility for the scope and character of the papers which are presented under its direct auspices.

It will likewise assume responsibility for final printing and

publication of papers with discussion, and as it chooses may effect such publication either as a part of its annual volume or as a separate publication.

These various duties and responsibilities relate to the participating societies individually and are not shared with any other committee or body.

Scope of Congress.—This convention recommends that the scope of the proposed Congress, as determined by the number and character of the societies invited to participate, be determined by the seven national societies to which this report is primarily made, acting conjointly in such manner as may be hereafter determined.

Other Duties and Activities.—In addition to the preceding outline of suggested duties and activities inhering in the national bodies themselves, either individually or conjointly, there will be certain further general duties and activities which must be shared among the participating societies or delegated in some measure to a representative committee. Such duties may be briefly noted under the following three heads:

(1) Local Committee Activities.

(2) General Publicity.

(3) Social Events, Excursions and like attentions to foreign visitors.

It is clear that in carrying to a successful issue an undertaking such as the proposed Congress there will be required a strong and widely representative local committee.

This convention recommends that the nucleus of such a local committee should consist of a local executive committee comprising three representatives from each of the participating national societies, such representatives to be appointed by the council or other appointing power of each society, having in view such nominations or suggestions from its local members or branch as they may desire for their information or guidance.

The general duties of such a committee are sufficiently evident from its name. It will have no authority to speak for any national society except as it may receive direct authorization to do so. It will serve primarily as a link between the Exposition authorities and the various national societies, and will in general endeavor to correlate all effects and interests of a local character toward the success of the undertaking.

Program of Meetings.—Each society will naturally prepare and be responsible for the program of its own meeting. It will be desirable, however, to secure something in the nature of a

program of meetings, simply to insure the entire series within a reasonable total time of perhaps 15 days, without lost time, and in such sequence or concurrence as shall be mutually most agreeable.

Such arrangements would most naturally be made through the local executive committee acting as an intermediary between the various societies and the Exposition authorities, and as a general clearing house for all such matters as may affect the various societies in a collective sense.

Joint or Mass Meetings.—While papers generally will be presented under the auspices of the society which has secured their preparation, it is not unlikely that it may seem desirable to hold certain joint or mass meetings or assemblies at which distinguished foreign engineers or others may have the opportunity of addressing a larger audience than might attend the meetings of a single society. It may seem desirable to open the Congress with some such meeting.

Such details may readily be arranged by the suggested local executive committee which will act in this regard, as in all others, on behalf of such groups of societies as might desire to make such arrangements.

Publicity.—Regarding publicity, the local committee will naturally be expected to look after such part of this program as may relate to the Pacific Coast in general, California, San Francisco and the Exposition itself.

In addition, each national society will naturally take such steps, both officially as a body and individually through its members, as may serve most effectively to bring the matter to the favorable attention of its own members throughout the country, and in particular to that of such foreign societies as it might naturally be expected to invite.

Social events, excursions, etc., will naturally be arranged by the local committee, acting, however, in cooperation with the various national societies, and as their direct agent in the case of any special arrangements which they may desire to make.

Finance.—The various participating societies will naturally provide, each in its own way, for such expenditures as may be necessary to carry out its own individual part of the program as outlined above. In addition there will be need of certain general funds, especially for the activities of the local committee.

This convention does not recommend any specific plan for providing such funds, believing that it may be safely left as a

detail to be later determined, in case the proposed outline plan of organization secures general approval.

For social events, excursions, etc., it will be necessary, presumably, to depend largely on private contributions. This also is a detail which is left for later consideration.

Time of Proposed Congress.—This convention has considered carefully the question of the time of year most suitable for the successful holding of a Congress such as that proposed, and begs to report that in its opinion the month of September (more exact dates to be later determined) will prove the most acceptable both as to climatic conditions and the general personal convenience of those who will desire to attend.

Assembly Rooms for Meetings.—This convention has received through representatives of the Exposition authorities, authorized to speak for its President and Board of Directors, full assurances regarding the adequate provision, free of all expense, of suitable assembly rooms, convention halls, etc., as may be required for a Congress such as is herein contemplated.

These assurances, in written form, are contained in a letter addressed to the chairman of this convention by the chairman of a special committee of the Board of Exposition Directors, fully empowered to give to this convention assurances regarding such assembly and meeting rooms, and regarding the cordial coöperation and support which the Exposition authorities will extend to such an Engineering Congress.

In conclusion this convention desires to report and to recommend to the national societies here represented, briefly as follows:

(a) It is the sense of this convention that it is highly desirable to hold in San Francisco in the month of September, 1915, an International Engineering Congress.

(b) It is the sense of this convention that the general plan of organization and management herein outlined is that which will prove best adapted to this purpose, and such plan is therefore recommended to your favorable consideration.

(c) Should such outline plan meet with your approval this convention begs to recommend prompt action on the appointment of the proposed local executive committee as herein suggested, and early consideration of ways and means to provide for the clerical help and other expenses necessary to make its work effective.

PERSONALS.

H. C. Bellinger has been elected president of the Australasian Institute of Mining Engineers for 1912.

J. Parke Channing will have the management of the newly organized Naumkeag Copper Co., formed by the General Development Co., to operate properties near Houghton, Mich.

Francis Drake has taken an appointment as consulting mining engineer in Rhodesia for Messrs. Lewis & Marks, of London.

Hiram W. Hixon has left Philadelphia for La Aurora, Teziutlan, Puebla, Mexico, and will have charge of the smelting work of the Teziutlan Copper Co. at that place.

D. C. Jackling has been chosen a director of the Butte & Superior Copper Co. in place of J. B. Becher, retired.

Benjamin B. Lawrence has been appointed consulting engineer for the Horn Silver Mining Company, at Frisco, Utah.

Waldemar Lindgren was elected vice-president of the American Institute of Mining Engineers at the annual meeting in February.

C. H. Munro has resigned as manager for the Orsk Gold-fields.

CHANGES OF ADDRESS.

Drake, Francis.....Box 249, Bulawayo, Rhodesia

Wright, Louis A.....813 Mills Building, El Paso, Texas

CALENDAR FOR 1912.

MEETINGS OF SECTIONS.

New York:*

Thurs., Apr. 18.

San Francisco:

Philadelphia:

*Thurs., Apr. 4.

*At the Union
League Club.

*All meetings will be at the
Engineers' Club at 8.30 p.m.,
preceded by a dinner
(informal) at 6.30 p.m., unless
notice to the contrary be
given.

The Secretary has not yet received notice respecting the
forthcoming San Francisco meetings.

COMMITTEES.

Executive Committee.

H. M. CHANCE
J. PARKE CHANNING
J. R. FINLAY
W. R. INGALLS
H. S. MUNROE

Annual Medal.

H. S. MUNROE, *Chairman*
JAMES F. KEMP
ARTHUR L. WALKER

Professional Ethics.

B. B. LAWRENCE, *Chairman*
F. LYNWOOD GARRISON
S. W. MUDD

Mining Law.

H. V. WINCHELL, *Chairman*
C. W. GOODALE
M. L. REQUA

Professional Training.

A. L. WALKER, *Chairman*
S. B. CHRISTY
F. W. BRADLEY

Panama-Pacific Engineering Congress.

E. H. BENJAMIN
F. W. BRADLEY
C. W. MERRILL

Standardization.

C. R. CORNING, *Chairman*
ROBERT PEELE
HENNEN JENNINGS

Mining and Metallurgical Society *of America*



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OFFICERS FOR 1912.

President, J. PARKE CHANNING, 42 Broadway, New York.

Vice-President, J. R. FINLAY, 52 William St., New York.

Secretary, {
Treasurer, { W. R. INGALLS, 505 Pearl St., New York.

Executive Committee: Messrs. H. M. Chance, J. Parke Channing, J. R. Finlay, W. R. Ingalls and H. S. Munroe.

COUNCIL.

At large, ex-officio.

J. Parke Channing, 42 Broadway, New York.....Retires January, 1913
J. R. Finlay, 52 William St., New York.....Retires January, 1913
W. R. Ingalls, 505 Pearl St., New York.....Retires January, 1913

Districts 1-2-3.—New York and New England.

H. S. Munroe, Columbia University.....Retires January, 1913
T. H. Leggett, 25 Broad St.....Retires January, 1914
J. F. Kemp, Columbia University.....Retires January, 1915

Districts 4-5.—New Jersey, Pennsylvania, West Virginia, Ohio and Maryland.

H. M. Chance, Philadelphia.....Retires January, 1913
F. Lynwood Garrison, Philadelphia.....Retires January, 1915

District 6.—District of Columbia and Southern States.

Waldemar Lindgren, Washington.....Retires January, 1914

District 7.—Michigan, Minnesota, Wisconsin, Illinois, Iowa and Missouri.

H. V. Winchell, Minneapolis.....Retires January, 1914

District 8.—Colorado, Utah and Nevada.

Philip Argall, Denver.....Retires January, 1915

Districts 9-10.—Oregon, Alaska and California, except Los Angeles, Santa Barbara and Pasadena.

H. F. Bain, San Francisco.....Retires January, 1914
F. W. Bradley, San Francisco.....Retires January, 1915

District 11.—Arizona, Mexico, Texas, Oklahoma and those places in California not included in districts 9-10.

S. W. Mudd, Los Angeles.....Retires January, 1913

District 12.—Montana, Idaho, Washington and Canada.

C. W. Goodale, Butte.....Retires January, 1913

OFFICERS OF SECTIONS.

NEW YORK.

SAN FRANCISCO.

S. B. Christy,
Chairman.

H. F. Bain,
Secretary.

Geo. C. Stone,
Chairman.

E. G. Snilsbury,
Vice-Chairman.

Louis D. Huntoon,
Secretary.

PHILADELPHIA.

R. H. Sanders,
Chairman.

F. Lynwood Garrison,
Secretary.

Mining and Metallurgical Society of America

Vol. V

April 30, 1912.

No. 4

ANNOUNCEMENTS.

Badge.—The badge of the Society, officially adopted by the council, may be obtained from the Secretary at a cost of \$5 when made in gold, silver and blue enamels; \$20 when made in gold, platinum and blue enamel. The badge may be obtained either as a pin or as a watch-charm. In ordering, be particular to state which form is wanted.

Bound Volumes.—Bound volumes of the Bulletin of the Society for 1911 may be obtained from the Secretary for the price of \$1.50. Any member desiring a complete set of the bulletins for 1911 unbound can obtain it, free of charge, by application to the Secretary.

Changes in Address.—Members are requested to notify the Secretary promptly of changes in address.

W. R. INGALLS,
Secretary.

MINUTES OF MEETINGS.

NEW YORK.

A meeting of the New York section was held, after an informal dinner, at the Chemists' Club, on Thursday April 18, at 6.15 p. m.

The meeting was called to order by the Chairman, Mr. Stone. Those present were Messrs. R. M. Catlin, L. D. Huntoon, H. H. Knox, E. B. Kirby, T. H. Leggett, J. W. Mercer, W. A. Pomeroy, A. H. Rogers, G. Riggs, G. C. Stone, M. B. Spaulding, A. L. Walker.

The Chairman.—As the minutes of the last meeting have been printed in the Bulletin, unless there is some objection they will stand as printed. We will now proceed with our discussion of "The Paralysis of Mining Districts, Causes and Remedies

Therefor." I believe our secretary has something to say on this subject.

L. D. Huntoon.—During the discussion of this subject at the last meeting various points were brought out regarding the prospector, prospects, and the Government requirements. It appears to me that the conditions surrounding the prospector of today are so different from the conditions forty to sixty years ago that the old type of prospector, searching for valuable deposits, has fast disappeared; in his place we find a man who is searching for a surface showing to sell to a promoter, who in turn organizes a company and sells the stock to the public for stock profits only. Very few showings are prospected by the original locators, and the promoters are careful not to explore the deposit for fear of destroying its prospective value. Porcupine is an illustration of such camps, where the so-called exploration work consisted of vertical shafts in the country rock. This large expenditure of money has developed only two or three mines and the remaining area will have to be explored before any mines can be developed. There must be some good reason for this change in the character of our prospectors, and I think the reason is largely his inability to interest capital to explore what he has located.

The old type of prospector worked in the mines part of the year and prospected during the remainder of the year, searching for valuable deposits. When such a deposit was found he had little trouble in finding men who would furnish the capital necessary to explore it. Today the prospector is compelled to go to brokers or promoters. In case the prospect is offered to a large exploration or development company, the question, "how much ore is blocked out," is immediately asked, and having no ore blocked out the property is turned down. This condition of affairs, I think, has driven the old type of prospector out of business and has developed a new type, who are in the business solely for the profit to be made from the sale of stock.

T. H. Leggett.—I believe that the tendency of prospectors to stay off the vein has not developed entirely during the last ten years. I have seen a prospector, having a vein dipping 40 to 70 deg., with a fairly good looking outcrop, go off into the hanging wall and sink a shaft because he wanted to strike the vein in depth. The man simply wanted to get depth.

R. M. Catlin.—Prospectors in Nevada thirty years ago did not know whether they were on or off the vein. The camps there were found more by accident than by design. The first fellow who found ore had been kicked out of a saloon; then, after fin-

ishing a bottle of whiskey he had in his pocket, he dug into the ground and sold out in sixty days for \$80,000. I do not know whether you call him a prospector, but he found ore. I could relate a great many other accidents which resulted in big discoveries. I notice no difference between the prospector of today and the prospector of thirty years ago. They are all more or less hopeful wanderers. They travel as far away as they can, and then go to work.

H. H. Knox.—I venture to predict that the old prospector will come back into his own a little later. Since the organization of the United States Geological Survey, attention has been directed mostly to new mining camps and to the monograph system, as they call it, of examination and reporting. It seems now, however, that there is to be a certain departure from that method, and that the investigators are going to devote themselves a little more to studies. When that system is more advanced, I believe it will bring the old prospector once more into the field, but he will hereafter be directed by the data and knowledge obtained. This is being done in a small way by mining companies; they still have the old prospector at work, but he is being directed by geologists.

E. B. Kirby.—The attitude of the prospector of today was well expressed in a conversation I once had with an old member of the craft. He was one of whom I saw a great deal in the Nevada and Goldfield days, many years old, typical in every way. The point of his talk was, where can we go? Every place in Nevada to which a man goes he finds monuments, and if you set to work, you will find somebody there.

While he was only one individual, his point of view is typical. It represents the situation thoroughly. I asked him why he did not go to Alaska, and he replied, "I am an old man; I learned my business and made a good record as a prospector, and I know I am better than the average, but to go to Alaska, someone must grubstake me to the amount of \$1000 or more. Very few of us can finance ourselves to that extent. Then again that country is rather severe for us old fellows."

The old time conditions under which mineral veins were discovered are passing; the history of the discovery of a mining camp, its decline and paralysis, is simply a repetition of conditions that have existed since the beginning. This idea grew on me, and some years ago I took pains to look up the history of certain mining camps, and the conditions which bore upon them. I was so much interested that I presented my conclusions in a paper on "The Paralysis of Mining Districts" two years ago at the Goldfield Mining Congress, as I hoped through that medium

to reach more of the people out west. The history of a mining camp, from its discovery to its decline and paralysis, is nothing new. It occurred in Ontario, in Tonopah, in Greece, in Africa, and in the Caucasus. First is the discovery, then the wild scramble for possession of territory, then the taking up by private ownership. Next the owner tries to avoid developing his property himself, hoping to take advantage of his neighbors' work, or possibly waiting for some one else to buy it at a high figure. The result is that only the deposits first discovered are worked; the other owners stay around to await developments or a chance for a sale. An owner will never sell land without discounting to an incredible extent its future possibilities, and will never reduce his terms unless he is forced to by necessity. The result is that around the edge of the district you begin to see paralysis, and companies shutting down. Inside the district you find only a few properties at work.

It seems to me that a remedy would be to enforce the principle that a man owning a piece of mineral land must work it or get off the claim. Wherever this principle is violated, mining becomes paralyzed. This plan was worked quite successfully in California in the early days, but then the miners were there to enforce it. Perhaps the most successful plan, in general application, was that of the mining ordinance of Spain of 1783 or thereabouts. This plan was applied not only on the peninsula of Spain itself, but also in the Spanish possessions. Many believe that the Australian method will accomplish the desired end.

The method we shall eventually adopt will perhaps be that of taxation. Tax those claims that are being kept idle until the owners cannot afford to hold them idle any longer. My own opinion is that the mining industry in this country is only just beginning. When I see the vast areas practically untouched, I feel that when conditions are such that a prospector can get access to this land, there will be a rejuvenation of the mining industry.

R. M. Catlin.—There are a great many difficulties in the law of 1872. The apex feature has not been a happy one, and neither has the annual assessment work clause. No provision is made to insure that the assessment work shall actually be done.

A. H. Rogers.—The remedy can hardly be applied in this country, it seems to me, under the conditions to which Mr. Kirby has referred. For example, consider the holding of claims on the outskirts of mining camps, and the patenting of claims. You cannot take away or force a man to give his title to the Government. Mr. Kirby's plan of taxation might also be difficult

because it is pretty hard to compel a mining community to tax the mining industry. Possibly a local problem might be worked out by taxing the claims which are long idle, and remitting a certain portion of the tax on properties under operation.

R. M. Catlin.—Most of the claims referred to are not patented. They are largely held by locators and only by virtue of their doing the annual assessment work.

A. L. Walker.—Would you tax the land or the value of the land, on the basis of production?

E. B. Kirby.—I would answer that by saying that to enforce the principle broadly it should not be applied to producing mines. In the Lake Superior district 90,000 acres of valuable land are being held just for sale. Taxes are merely nominal there. Now the application of this rule would be to tax those owners who are not working their land, but to require the working mines to pay only a portion of the present tax.

T. H. Leggett.—We all know that in newly opened mining camps the first discovery has the richest outcrop, and the further you go from the original location the poorer the ground is usually found to be. The owner who takes up this ground develops thus from a central point. As work progresses, a geological study is made showing that he is warranted in putting up additional money. Under the present law a great deal of the adjacent ground would be patented, and the object of this proposed taxation is to compel owners of claims to either develop them, or relinquish them to somebody who will. Taxation is to be made so onerous that they will have to act. It is an open question, in my mind, whether such a system would do more than merely cause relinquishment of the land. A capitalist will say that he has to take so great a mining risk on ground which shows so little, that he does not see why he should also risk the heavy mining tax. It is a question whether more ground will really be developed under this stimulus.

E. B. Kirby.—The effect will be that only claims that are worth holding will be taken up. You must remember that this tax should not be very heavy, simply enough to make it worth while for an owner to work his ground. The tax will be adjusted by the community.

The Chairman.—Has this scheme been tried?

E. B. Kirby.—It is being tried in the Australian colonies.

H. H. Knox.—This scheme of putting the tax into the hands

of voters seems to me dangerous. Take, for example, a camp in which the whole industry consists of mining. Suppose a difference arises between the laborers and the corporations in regard to wages, the laborers demanding higher wages and the corporations refusing them. As the laborers will have the majority vote they will have a tremendous weapon.

E. B. Kirby.—The general principle I wanted to lay down is to place a burden on mining companies that are idle. In Michigan this question of taxation is now before the lower House. Michigan, as you know, is divided into two sections, the upper portion, engaged mainly in mining, and the southern, which is agricultural. At the present time the mining companies are staggering under the amount of the tax.

T. H. Leggett.—Any scheme of taxation based on mine valuation is dangerous.

The meeting adjourned at 10.30 p. m.

L. D. HUNTOON,
Secretary of Section.

PHILADELPHIA.

A meeting of the Philadelphia section was held at the Union League, Philadelphia, at 8 p. m., April 4, 1912, preceded by a dinner at 6.30. Members present: Messrs. Chance, Hutchinson, Queneau, Sanders, Garrison, and one visitor, Mr. W. F. Ferrier, of Toronto.

The minutes of the previous meeting, held Feb. 6, 1912, were read and approved.

The Secretary reported receipts of \$3.00 since the last meeting, and expenditures for various purposes of \$14.68.

The Chairman, Mr. Sanders, called attention to the subject set by the Council for debate, namely, the decline of the mining industry in certain districts of the United States. There was some desultory discussion of this subject, but not of sufficient importance to be recorded.

The Secretary, Mr. Garrison, made some remarks about his recent visit to Cobalt and Porcupine, which were supplemented by Mr. Ferrier, who has a much more intimate acquaintance with these districts. No further discussion than this and some general topics took place.

At 10 p. m. Mr. Hutchinson moved that the meeting adjourn, to meet again at the call of the Chair. The motion was duly seconded, was carried, and the meeting adjourned.

F. LYNWOOD GARRISON,
Secretary of Section.

SAN FRANCISCO.

The San Francisco section met, after dinner at the Palace Hotel, on Monday evening, April 1, at 8 p. m., S. B. Christy, Chairman. The following members and guests were present: F. W. Bradley, M. L. Requa, S. B. Christy, T. T. Read, J. F. Newsom, Whitman Symmes, G. H. Clevenger, Charles Butters, J. B. Keating, W. A. Prichard, T. A. Rickard, H. F. Bain, Howard W. Smith, H. S. Mays, Curtis H. Lindley, A. L. Weil, Philip Bradley, R. S. Beals.

The Chairman.—The Secretary of the Society wrote me that the Council had instructed him to suggest as a subject for discussion, "Causes for the decadence of certain mining regions, notably Colorado," asking me to suggest it to this section. I submitted this matter to our program committee, which decided that we have other topics which interest us more at this time; we have therefore put that subject on file for future debate.

This committee has decided to bring up this evening the topic of proposed legislation concerning the oil industries of the United States. We, of course, are particularly interested in the oil interests of California, and we had hoped to listen to Mr. Requa, who has fortunately recovered from a surgical operation. He has provided two very good substitutes; the gentleman who will open the discussion is a graduate of the law department of the University of California, and had devoted much attention to the practical as well as the legal aspects of the oil industry. I have great pleasure in introducing Mr. A. L. Weil.

A. L. Weil.—The miner has always been the symbol of individualism. The man who leaves the haunts of civilization and goes out into the mountains with his pack on his back is about as far removed from the control and confines of the government as any man possibly could be; and still it is in regard to the mining interests of the United States that the socialistic doctrines of recent times are being most stringently enforced. And the strange part of it is that the oil man, who is perhaps a miner only by courtesy, is earnestly seeking this regulation and control by the Federal Government, or by some government at least. In that he is probably unique among all the so-called exploiters of the public resources.

The reason for this is not far to seek. Oil is a fluid product, which does not stay where it is put; and in order properly to control the situation in the field, individual effort is not sufficient, but the field must be handled as a whole.

You all know, and it is not necessary to enlarge on this matter, that insofar as the oil lands have not been withdrawn from

entry by the Federal Government, they are now being taken up under the provision of the placer mining law. That law was, of course, passed for entirely different physical conditions than those which exist in the oil field, and therefore is not entirely suited to that form of mining. The chief difficulty arises from the fact that a long period of time ordinarily elapses between the posting of notice and the perfecting of location by the making of a discovery. During that period of time the locator is in a very anomalous condition, one absolutely unknown to statutory law, although the court authorities, or rather the cases, have defined his position with some precision, in recent years.

But in spite of the fact that the placer mining law is so obviously inapplicable to the oil-mining situation, it has, nevertheless, some very decided advantages which have been overlooked in the general flood of obloquy cast upon it in the last few years.

The first great advantage of the placer mining law is one that it has in common with many old laws. It has run the gauntlet of judicial decision on numerous occasions, and therefore we are reasonably well-informed as to what a decision will be under a given state of facts. This is a very important matter, particularly where title to real property is concerned. If we should get a new statute, no matter how carefully it is drawn, it would be a matter of years, and would require a vast expenditure of money and time in litigation before we should arrive at the same degree of certainty that we have now arrived at with regard to the interpretation and construction of the placer mining law.

But a more important advantage is the fact that it is a general statute. It seems more like a constitutional provision than a statute, not having the details that we ordinarily expect in statutory enactments; and it leaves it to the state and even to the mining districts, in which the property is situated, to make the necessary field laws and regulations to meet the physical conditions of any particular mining district.

Now, that is a great advantage in regard to oil mining. As I will subsequently point out to you, the oil fields are in great and immediate need of stringent statutory regulation in order to prevent their destruction; and if we cannot get any assistance in any other way, if it is impossible for us to obtain any relief by governmental means, by direct statute, there is always a possibility that the states and the districts themselves, under this general delegation of power permitted to them under the placer mining law, may in some way work out our salvation under that power.

These advantages seem to me to make the placer mining law, disadvantageous as it is in many particulars, far preferable to any plan that has been proposed in lieu thereof.

The alternative scheme for the disposition of mineral land, which has been offered to the West, is a plan which has been worked out by the members of several bureaus in Washington, and is nothing more nor less than that the 700 million acres of land still undisposed of shall remain under perpetual tutelage and subject to perpetual tribute to the Federal Government. In other words, that the Federal Government shall forever retain the fee simple title to the mining lands and other public lands of the West, and lease out the beneficial use thereof to the agriculturalist, the stockraiser, the oil miner, and the lumberman.

To this plan, after giving it as careful attention as my faculties permit, I am unalterably and irrevocably opposed; and my opposition may be summed up in the sentence that the regulation of these matters from a constitutional standpoint would be ineffective and from a physical standpoint inefficient. I want to take up first the constitutional ineffectiveness of the government in dealing with this matter.

The great problem of the oil fields today is that of handling the water difficulty. In drilling an oil well, water is almost invariably encountered at greater or less depth, under heavy artesian pressure, and the control of this water and the occlusion of it from the oil sands present a serious problem. It is generally believed that if these waters are permitted to percolate into the oil sands, being heavier, they will either displace the oil entirely, or to such an extent as to make its recovery commercially impractical.

It will further appear that in order to handle this problem successfully it is necessary that a particular oil field or district be handled as a unit. It matters not how diligent or how scientific one operator may be in shutting off his water; if the adjoining owner permits these underground streams or these percolating waters, as the case may be, to infiltrate into the oil sand, the precaution of the first man is absolutely useless.

It will further appear on consideration of the facts in the oil mining industry that probably 70 per cent. or more of the oil lands are already in private ownership; that is, every other section of land in the oil field belongs to the railroad, and of the even numbered sections of land, a great many have been patented, some under the mining laws, some under desert land entry, some have been scripped under the various classes of agricultural entries, forest lieu lands, and the like. Now, over these lands that are already in private ownership the Federal Government has absolutely no jurisdiction. It is as impotent as the Czar of Russia in regard to making regulations for these lands; and the rules of the Land Office and the statutes of Con-

gress could be disregarded with absolute impunity on these privately-owned wells. The only political body which has constitutional power to handle the fields as a whole, is the state legislature, under the general provisions of police power. They can handle the water situation; the Federal Government cannot.

Now, one of the great fundamental ideals of conservation is to stop this preventable waste; and the infiltration of water is preventable waste. The best informed men in the oil business—I do not pretend to be a technical expert—are absolutely of the opinion that if the water situation is not controlled it will be only a few years before the oil fields of California are absolutely destroyed. For that reason I say that Federal control would be constitutionally inefficient. Here is one of the plainest and most elementary problems of conservation. A literal interpretation of the word "conservation" is to avoid preventable waste, to prevent the destruction of a public resource by negligence or want of skill. And yet right here the Federal Government, which aspires to control this matter, is absolutely without power.

As far as the physical control by the Federal Government is concerned, it is a matter of history that the Department of the Interior, since its very inception, has been probably the most heavily burdened of all the departments of the Federal Government. At the time of its inauguration, 1,055,000,000 acres of the public lands was thrust upon it. These lands were given to it to control, regulate and dispose of. Its officials were absolutely unfamiliar with the conditions; they had absolutely no idea whether the bulk of their lands were swamp lands or arid lands or mining lands or agricultural lands. They knew nothing of its physical condition. They knew nothing of its resources, of its possibilities, and nothing of the needs and demands of the few people who were occupying it. Of course, their administration was an absolute failure; as is no more clearly demonstrated than in their administration of the railroad lands of the West, which was, indeed, a dark page in the history of the United States. This failure that has fallen to the lot of the United States Department of Interior is not due to any lack of skill, or intelligence, or diligence on the part of the officials of the Land Office, but is due to the inherent defects of the system. It was a human failure, because it is impractical and impossible for one bureau successfully to handle a billion acres of diversified land and handle it intelligently.

As a result, the Department of the Interior, and particularly the Land Office, has always been a monument of governmental inefficiency, and, with singular infelicity, they have lost no opportunity to maintain their position of unenviable pre-eminence.

The Land Office has always been administered on the theory of a bureaucracy. A bureaucracy is a success or a failure according as its traditions are good or bad; and the traditions of the Department of the Interior and the Land Office have been invariably bad. In the course of its duties it has, among other things, the obligation to pass from time to time upon the titles to real property; and in passing upon those titles it has ignored the fundamental principle that the most important thing in the determination of law relating to real property is that the decisions shall, be certain and unvarying. The doctrine of *stare decisis* is probably the most influential, the best established, and one of the most beneficial principles of our system of law; but in their decisions this fundamental principle has been constantly ignored.

If you will turn to the last volume of the decisions of the Land Office, Volume 39, you will find twelve full-page columns of small type, tabulating the overruled and modified decisions of that department. While I have never made the count I venture to say that the Land Office, in its 39 volumes, has overruled and modified more of its previous decisions than the United States Supreme Court has in its 221 volumes now extant.

To turn to a specific illustration: About three years ago an Assistant Secretary of the Interior handed down a decision of which you have all heard, known as the Yard decision, which was afterwards affirmed in the Bakersfield Fuel and Oil decision. In that decision the Assistant Secretary reversed a course of practice which had been invariably followed in regard to allowing placer claims for a period of 20 years; he not only reversed that, but he refused to follow a decision of the California Supreme Court, whose judgment had been affirmed by the Supreme Court of the United States. He said, in the course of his opinion, that the reasoning of the California decision did not appeal to him and he refused to follow that decision of the California court. I do not say that the learned assistant secretary's technical view of the placer mining law was wrong, and I do not say it was right; but I do contend that his decision was wrong. It makes no difference what the law is; it makes no difference whether the law requires you to sign a paper at the top or at the bottom, so long as you know, so long as the court determines you must sign it on the bottom, and every time it comes before the court they hold that it must be signed at the bottom.

Now, in disregard of the previous decisions of the Land Department and of the decision of the Supreme Court of California, this assistant secretary threw clouds on titles to real estate in California worth not less than twenty million dollars,

every acre of which was in the hands of legitimate, bona fide purchasers, who had acquired these lands and whose attorneys had passed on the titles in reliance on the early practice. Any department that will do a thing like that is operating under a wrong tradition, and is unworthy of this great trust of administering, in perpetuity, the 700 million acres of land in the United States that remain unalienated.

Now, let us see the result of the department's practical working. We are now well into the third year of the so-called conservation policy in the State of California, and the time has arrived when we can reasonably determine what the tendency is and what its probable result will be.

Two great ideals of conservation have been laid down by its advocates in Washington: First, that there shall be a maximum of use to the present generation with a minimum of loss to posterity; in other words, that the production of a public resource at any particular period shall nicely balance the needs of that period, and that no surplus shall be lost to posterity nor be useless to the present generation. Second, that property shall be kept in the hands of small owners, and out of those of great monopolistic corporations.

Now, these are two very worthy ideals, and by themselves would probably make conservationists of every one. But what has been the result? By the statute passed in June, 1910, generally known as the Withdrawal Bill, Congress provided that in order to hold placer mining claims in oil fields it was necessary to keep constantly and uninterruptedly at work. A cessation of work at any time before discovery resulted in forfeiture of the claim. Now, during 1911 the State of California produced in the neighborhood of 79,000,000 bbls. of oil; the consumption during that same year was in the neighborhood of 67,000,000 bbls. On Jan. 1, 1912, 40,000,000 bbls. of unused oil were in storage. If the conservation ideal counts for anything, it was now high time to stop production. But it was impossible to do that; the law required the owners to go on. The sump holes were full, the storage tanks were full, the pipe lines were full, and still, under the law, every man drilling on public land had to keep on putting down his wells, spending his money, and bringing additional oil to the surface, which was absolutely useless to any one.

During the months of January and February of 1912, instead of the situation being relieved in any way, 1,800,000 bbls. in storage were in excess of what there was on Jan. 1, or a total surplus storage of almost 2,000,000 bbls. a month.

There is hardly an operator in the oil fields, I venture to say, who is now drilling on the public lands who would not

gladly discontinue his work, but it is impossible for him to do so. If he stops work for any considerable length of time—and even if he does keep at work, as a matter of fact—he will have the greatest difficulty in getting his patent through the United States Land Office. This surplus oil which has been brought to the surface, instead of according with the ideals of conservation, has caused an absolute loss to posterity and a heavy burden on the present generation, with absolutely no possibility of their making any immediate use of it.

Now as to the other problem, to prevent the land from falling into the hands of the large proprietor. Next time you have an opportunity to look at an oil map, I suggest a comparison of the Coalinga field, the old Kern River field, and the south end of the Midway field on one hand, and the north end of the Midway and the new fields on the other hand. The first three were all developed on what you may call the go-as-you-please system. An investigation of the map will show that nearly all the land is in the hands of small concerns; in fact, in Coalinga 18 oil companies are operating on 640 acres. On the other hand, if you turn to the north end of the Midway field you will find all the companies owning several sections of land; and a more careful search will reveal that nearly all the claims are held in well known names. That was brought about by the Government's persistence in throwing clouds on the title of unpatented lands, when they absolutely know the titles are good. As a result, the small man is blocked at every step. Outside capital will not invest in such a hazardous business as oil mining, if it has to fight with the government to get the land in case it should be so fortunate as to discover oil. As a result, the big corporations, who are advised as to their legal rights and are willing to wait for their returns, and have sufficient capital to put up a fight with the government, go out and buy the land from the little man; he has to be satisfied with what he can get, and all the big profit goes to the buying corporation.

From a practical, physical standpoint the administration of the Land Office has been largely a failure. The administration of the conservation policy has brought about results diametrically opposite to what was intended, and as we can judge of the future only by our experience in the past, it does not encourage us to look for any further regulation of this matter by the Federal Government.

Another difficulty of this problem results from the impossibility of getting sufficient statutory regulation from Congress. As I have previously called to your attention, the placer mining law is a very general statute and may thus be adapted to the physical needs of various mining and mineral districts in which

the land is situated. On the other hand, if we should get a specific statute from Congress, it would probably be drawn by some one who was familiar with one branch of mining, or one particular mining district; and while it might be well adapted to the needs of one particular industry or district, it would seriously handicap the development of another district.

It must be very apparent that if we are to have minute regulatory statutes that we must have different statutes for the different states and different statutes for the different mining industries or the different branches of it; and we well know, owing to the heavy burdens on Congress, that this is impossible.

I can illustrate that by something that happened in Washington at the time of the passage of the conservation bill. At the time it was under consideration, it was called to the attention of two of the Senators on the public land committee that, while the purpose of this bill was apparently to aid the legitimate and bona fide oil miner, they were throwing handicaps in the way of the legitimate miner and were leaving the field open to the fraudulent entryman. It was further called to their attention that since the repeal of the forest lieu land act practically the only fraudulent entries in the oil fields were being perpetrated through gypsum locations, that with the exception of the Lost Hills district 90 per cent. of the patents issued on gypsum were issued on fraudulent affidavits. What was the answer of the Senator from Utah to that suggestion? He said, "I am very familiar with this situation; but I want to point out to you that there is a growing and flourishing gypsum industry in Utah, and that it is absolutely impossible for us to pass any legislation which shall handicap this industry in the State of Utah in order to prevent a few fraudulent entries in the State of California."

Gentlemen, I think the Senator was right. There is no reason why any industry in any one state should be handicapped in order that another state should succeed. There is no reason why they should stop a man who is legitimately mining gypsum in Utah because another man is fraudulently attempting to do so in California. But that simply goes to illustrate my point that we must have divergent legislation for the different states.

Legislation that is well adapted to the established and well defined oil fields in California would probably seriously handicap development in new oil fields. Therefore it seems to me impractical to get minute regulatory statutes from Congress, when it has hardly time to attend to the most pressing matters which concern the country at large.

There is also another aspect which makes Federal leasing undesirable. The idea of Federal regulation carries with it the

idea of royalty to the Federal Government. In the bill introduced by Senator Nelson of Minnesota, it was provided that the royalty should be 15 per cent. of the gross production, allowing nothing to the operator for use on the field. If we take 50c. as a fair price for the oil, and take last year's production as a fair average for this state, and if we further assume that Senator Nelson's bill had gone into effect, we should see \$6,000,000 going out of California to Washington. The West cannot stand this drain. It is too heavy a drain for a flourishing state like California, and would be absolutely detrimental to some of the interior states that are further east, but are still known as the "Far West." If we are to pay any royalty—and the oil men can well pay it to some institutions—it should be paid to the state, where it will reduce the general burden of taxation, and at the same time keep the money in circulation where it is most needed.

I appreciate that one of the heads of the department in Washington has said that this money, taken out of the Western States, will be spent there again—and so it will be, if we have a Congressman who stands right with the majority, but not otherwise. The only safe way to keep the money in circulation in California is to keep it here and not let it get away from us.

In spite of the criticisms I have made on the Federal Government, I want to emphasize again that the oil men need legislation; they invite legislation and regulation; but that regulation should be left to legislatures of the states in which the various lands are situated. It should be left to men who are familiar with the physical conditions in regard to which they are legislating, who have the time to take up the matter, and who have sufficient interest to see that the legislation is appropriate to the welfare of the state.

The state could well pass a royalty bill which would require, let us say, a very small royalty from the man who discovers a new oil field; perhaps none at all, as a reward for his enterprise. Then there should be a moderate royalty, on the average oil operator; and finally a larger and perhaps a progressive royalty after the production has reached a certain amount, for the purpose of curtailing over-production and preventing the land from falling into the hands of monopolies.

Then the state legislature could, without any constitutional limitations and inhibitions, regulate these water conditions. It could regulate such propositions as line drilling, pipe lines, and the like, which are absolutely beyond the power of the Federal Government.

I submit that the oil men of this state want efficient, not officious, regulation. They want regulation which will open up

the lands of the West to the people of Europe and the East, who can come out and develop them as they should be developed. They want a regulation which will not bottle up the oil, but a regulation which will insure us a cheap and permanent fuel, which is the very foundation of the manufacturing interests of this coast. In other words, we want a regulation which will make of the West a flourishing community, not one which will make of it another Ireland saddled with the incubus of absentee landlordism.

Mr. Bradley.—I understood Mr. Weil to say that discovery was the perfection of placer locations; I understand that you cannot initiate a location at all until after you have made a discovery. He also spoke of water destroying the oil; as I understand it, the water drives oil from one point to another. And he also spoke of over-production because of the government's requirements that the locator shall work incessantly; as I understand it, over-production comes from overdoing the business.

The Chairman.—In most public questions there are two sides, one seeming decisive till the other is presented. In the law, particularly, men are trained to see the other side of the case. I used to be one of those who believed that lawyers were useless members of the community, but I have gradually learned to think differently; but I think that none of us realizes sufficiently the great advantage of hearing the other side of any case, no matter what it may be. The training of the lawyer is one which, more than any other training develops that faculty. We have with us tonight another honored friend, and I am going to call on Judge Lindley to give the other side of the case. I understand that he has given considerable attention to conservation.

Hon. Curtis H. Lindley.—I do not know that I should be considered an advocate particularly of any side of the case. All causes, of course, should be defended after they are attacked. I think probably my thoughts would run toward the discussion of the general question, leaving you to see what is the right side of the case, if there is such a side.

We recognize that these problems, which involve social and economic questions, are not new; we have simply reached that state of civilization when they are becoming acute. Other nations have passed through comparatively the same conditions. We find from the agrarian laws of Tiberias, the corn laws of Caius Grachus of the fourth century, down to the Diocletian and Julian laws, the attitude of the government toward the hinterland, the land of the people, was subjected to a great many

experiments; those experiments arose out of acute social conditions, and they were put forward for the purpose of attempting to relieve those conditions.

This country is peculiarly situated with reference to what we might call its agrarian policy. We have no element of the feudal system to contend with; and the government of the United States acquired a tremendous public patrimony, first through donation by the states and, second, by treaty or conquest of lands west of the Mississippi River.

The gentleman who has preceded me has ignored the fundamental fact in connection with the attitude of the government towards this land and its rights and privileges regarding it. His position seems to be based very largely, if I may so denominate it, on the individualistic idea, which we borrowed from the English common law, and incorporated into our legal and social polity, and that is that the individual is the center of all action, and that his personality and those things which he may acquire are entitled to the highest protection of the law, entirely without regard to the good of the group of individuals which constitutes society.

No individual has a right to any particular piece of government land. The original nucleus of the public domain was acquired by the government as the fruit of the Revolutionary War; the lands were ceded by the States, in the first instance, under a solemn compact that the government should act as a trustee of the lands for all the people; not for the people of any locality or any state or any part of a state. It was a trust charged upon the government to deal with that property for all the people; I am quoting precisely the language of the Supreme Court of the United States in construing the attitude of the government in dealing with these lands. Congress is the sole judge of when and in what circumstances an individual may acquire a right in the public domain. An invitation is extended to go upon that domain and acquire a homestead, for instance. If you comply with the law, this land is given to you whenever the government gets ready to do so. But its relationship to those lands is not governmental. That is to say, the government, with reference to its public land, exercises not governmental, but purely proprietary functions. It has the right to impose such conditions in the interests of all the people as Congress in its judgment shall determine; and in doing that it must look to the interests of all the people. It does not undertake to exercise any police power within the state, unless the state cedes to the government the right to exercise that police power. In the case of the post-office building in the city of San Francisco, for example, the state has ceded to the government a police

jurisdiction over that particular spot on the earth. But otherwise, in reference to the public land, it exercises no governmental function. It stands simply as the paramount owner of the land, holding it as a trustee. When California came into the Union, and every other state after the first thirteen, a contractual agreement was entered into between the prospective state and the government that the state should never in any circumstances interfere with the primary right of the Government of the United States to dispose of the soil. That compact exists between the United States and every state. In other words, for the purpose of executing a trust for all the people, the government holds these lands, and it may sell them or withhold them from sale whenever in its judgment the good of the people demands that it should do so, and the power to determine that rests entirely in Congress.

The preceding speaker named as a reason for the non-enforcement of the conservation policy the fact that the government is powerless to police the territory in which the oil wells are situated, to control the water situation, the state alone being able to do that. That is conceded. Many of the states of the Union have passed police regulations with reference to the operation of oil and gas wells; in fact, they have passed laws which prevent a man owning a gas well from permitting the gas to escape, so as to let it go to waste; and they have also made many regulations governing the manner in which these wells shall be operated.

Any one who should lease from the government, and should undertake to operate in those fields, would be subject to precisely the same law, that is, the law of the state. Thus the fact that the government might retain proprietary control as a landlord would not relieve its lessee from complying with such regulations as the state might make in that district. There is no divided jurisdiction. The line of jurisdiction between the Federal Government and the state is clearly defined and recognized by both. If the state enacts a general law covering the control of water in a district, providing for oil inspectors with certain powers related to the keeping of logs, and the determination of conditions as they exist in the field, for the purpose of protecting the wells from being drowned with water, those operating under United States licenses would have to comply with that law just as any other private proprietor would be compelled to do. In my judgment it then resolves itself to a question of pure expediency, as to whether the government shall continue this liberal policy, which started in the early days, of allowing people to go upon the public land and acquire the right to a given area for the purpose of developing mines; or whether we

have reached a stage in our civilization when something more than the individual prospector is to be considered; whether there is not a social side of this proposition which the government, as a trustee for all the people, and not for the prospector alone, should take into consideration. That involves a question of economics, a question of something more than individual inconvenience to a man or a set of men engaged in a given industry. It involves the welfare of all the people.

The natural tendency, of course, in all these industries is towards monopoly—I am speaking now of the industries which deal with the non-metallic substances. Of course, the danger of monopolization of gold output or of gold mines is infinitesimal, as also of all the other metals, although the natural tendency, through control of machinery and means of transportation, is in that direction.

The conditions existing in this country seem to have demanded a change of policy with reference to the disposition of these natural products of which oil is one. It is not what we call "*fructus industrialis*"; it is not a product of labor; nature has placed it in a storage reservoir, and the effort to take it out is not a creation of the product itself. The tendency is towards a concentration of activity, resulting in a monopoly; and so, in an attempt to correct some of the evils which manifestly exist in certain lines of our economics, it has been said that these things should be conserved. That is to say, there should be a maximum of production with a minimum of waste, and, if possible, some scheme should be devised under which the channels of trade would not all flow in one direction. In addition to this, some compensation to the government for the privilege has been suggested.

We know from a practical standpoint that a product like oil will ultimately be subject to the control of the man who handles the transportation and controls the market. That is the situation, not particularly discernible here, but the tendency is in that direction; and to check that tendency means have been suggested for the purpose of putting the matter under governmental control. By control I mean a proprietary control, a control which the proprietor of the land has a right to impose in the execution of a trust. So they have held, in the oil fields as well as in other mining activities—phosphates, potash, coal and natural gas, all being products which are essential to the well being of the entire community. These conservation laws were not devised in the interest of the individual; they were intended, of course, to accelerate individual action, and up to a certain point they have served their purpose; but new conditions have

arisen, which must be met on lines of social progress; thus has arisen the question that we have under discussion.

The placing of oil locations in the category of placer claims is an anomaly. The construction was a forced one, because they had to go there or nowhere. The land department started out, under Hoke Smith in the Cleveland cabinet, to hold that petroleum was not a mineral. Congress thereupon specifically put it in the mineral category.

Amid the questions with which we were confronted at that time, we overlooked perhaps the difficulty of making discovery in the case of petroleum, owing to its great depth and the necessity for expensive exploitation. But we are all acquainted with the history of the oil development in this state, and are familiar with what was attempted at that time. The entire area within the present oil fields was covered by placer locations, without discovery. In some instances, thousands of acres were covered by one set of men acting at the instigation of one man or corporation, in an attempt to secure an immense area so as to keep out others and to deal with those as speculative problems. That condition was extremely acute, and called for some action of the government in order to check that tendency. And to that condition, more than to anything else, do we owe what Mr. Weil complains of, the changed rulings by the Department of the Interior.

That sounds another false note in his argument. We find among the old-time lawyers an idea that when a court once decides a thing, whether it is decided right or wrong, every later court must decide that same way, although conditions may have changed. That, to a certain extent, is true in some lines, and perhaps constitutional lines.

The Land Department is a special tribunal, charged by the Government of the United States with the special duty of executing a trust. In discharging that duty it has many complex questions to solve. It solves them the best it can in all the circumstances. Its administration of the public land service has been a remarkable success. I know of no other tribunal, created by the laws of Congress, which has dealt with public questions with greater fairness. Less scandal has been connected with the administration of that system than with any other department of the government; and in the main they have made few errors. The Supreme Court of the United States has said that the decision of that department is entitled to the highest consideration, and is never to be reversed or disturbed unless it is obviously wrong.

Thus these changed rulings trouble us lawyers a great deal, because sometimes we advise our clients wrong and then blame

it to the land law—these changed rulings confront us frequently, but whenever they are changed, they are changed because the fundamental reason for the original rule has ceased to exist, and a new condition has arisen requiring a new rule.

Mr. Weil takes the position that the minute a man goes upon the public domain and acquires a possessory right, he is privileged to insist that the law, as administered by the department, shall not be changed to his detriment. He is only a beneficiary. The title to that land still remain in the paramount proprietor, and, according to some decisions, his right may be taken away from him before the government issues its patent. It holds the supervisory control over that land, and every man who goes on the public domain takes with him that knowledge. He comes with his eyes open. And any lawyer who takes the responsibility of passing upon an unpatented mining land title does so at his peril.

We all know that until a man gets a title by final entry and receives his certificate of purchase, he has no merchantable title. To say that any ruling of the department has clouded title to land, to the extent mentioned by the gentleman, is a statement which is not altogether accurate. The title to the land rests in the government; the possessory privilege, for the time being, is with the applicant. Thus no rights at all are infringed by the actions of the department. They rule, and the Congress does not interfere with their rulings. They are a law unto themselves, dispensing the law as they see fit and, except in very rare instances where under a conceded state of facts the title is given to another, the courts never interfere.

Now, as to whether the government should exact a royalty or not; that is purely a question of governmental policy. I apprehend that it has a right to exact royalty if it pleases.

Up to a quite recent period the operation of the public land system was an expense to the government. Lands were sold in many instances for \$1.25 to \$2.50 an acre. I remember a time when coal lands could have been purchased from the United States Government at \$10 an acre, beyond 20 miles from a railroad, or \$20 an acre within that distance of a railroad. If you look at the work of the Bureau of Classification in the Department of the Interior, you will see that the government is now getting as high as \$1,300 an acre for such land. Why shouldn't it? Great complaint is made about that. People say, "For many years you have sold these lands for \$10 and \$20 an acre; and what right have you to change your ruling?" It is the right of the paramount proprietor, acting under powers conferred by Congress, to adopt a policy in that direction which will most conserve the landed assets of the country, which are the prop-

erty of all the people. And if in doing so it interferes with a private industry, or interferes with some of its plans, or circumscribes its sphere of action and enables it perchance to make less money, that is no reason why the paramount power of the government in handling these lands should be curtailed. All that any man is entitled to is what the law promises him, and what the paramount proprietor says he may have.

Now, gentlemen, as I said before, these are purely economic questions. The unrest in this country is taxing the brains of its best people for a solution of some of the problems. I do not know that conservation will solve the problem, but I do believe that we should give it a fair trial. So far as the oil situation in California is concerned, I have not the slightest doubt that every man who has a bona fide claim upon the government for labor expended in an honest endeavor to produce something, every man who has spent money or honest toil in an attempt to develop oil, will be protected in one way or another. He will probably at least be given a preferential right over any one else when the government puts the land on the market, or recognized in other ways. I do not think it is necessary for any part of the oil industry to criticize the conservation measures. They are bound to come, for the purpose of trying to relieve the unrest, and to solve some of our present economic problems.

The Chairman.—The matter before us is a practical one. The Philadelphia section has gone on record as to certain proposed legislation in reference to coal land in Alaska, and it seems to me proper that the San Francisco section should propose some remedial legislation for the oil interests. According to both of the preceding speakers, the present placer location is not particularly adapted to the oil regions; although Mr. Weil has stated that it has certain advantages, he admits there is need for further legislation. Neither of these gentlemen has proposed any line of legislation which he could endorse, and I would like to call on both speakers to suggest some line of improvement in the present laws for locating oil land. The placer location being in some ways defective, it seems to me we ought to have some suggestions from both of the speakers along the line of remedial legislation. I do not know whether they are now prepared to do that, but it is a question that has to be settled if we are to improve the situation.

Mr. Lindley.—A suggestion has been made to Congress which appeals to me, and that is this: Take the oil lands out of the placer category, and allow a man to enter upon a given subdivision, more or less according to the character of the product, of sufficient size to justify the expenditure of capital to

equip the property; permit him to enter and remain there under a lease which protects him in his possession to the fullest extent while attempting to discover and put into condition his property; and finally give him something in the nature of a lease, on a royalty basis. The royalty may be large or small, depending on the character and quality of the product. That would remove the embarrassment of going upon the public land before discovery and having to spend a large amount of money before you get any right at all. The man may be protected in his possession, and may be perfectly free to develop the land. So far as oil exploitation is concerned, I do not suppose there would be any particular question as to the exact area, so long as it was reasonable.

I once had a case presented to me in Utah, where not a gallon of oil was yet discovered on an area pretty nearly the size of New Jersey.

This suggestion, of course, has to be developed to a working basis. In some countries the mining laws do not require discovery: British Columbia, West Australia and New Zealand. There a man can peg off a certain area; he gets a government license to hunt for minerals and in some instances pays a small royalty. I do not see why some such system cannot be worked out in connection with our oil industry.

Charles Butters.—The mining law of the Transvaal would control a condition such as is presented by the indiscriminate taking up of oil lands in California by promoters and speculators who wish, with very little expense to themselves, to control a large amount of territory for speculative purposes, and to prevent the legitimate operator from acquiring any land.

The Transvaal gold law permits you to peg out as many claims as you wish, but for each one you must pay 5s. per month, a claim amounting to about $1\frac{1}{2}$ acre. You are obliged to pay monthly for each claim, and as the claims are small, the probability of one person's taking up a large amount of land, and holding it from year to year, with such a heavy charge, is not very great; even if the claims are taken up, they are not carried for very long unless they are extremely promising.

In the case of a promoter or speculator wishing to take up 2,000 claims, which would be 3,000 acres, the cost per month would be \$2,500, or \$30,000 per annum. One thousand claims, which is about 1,500 acres, costs \$1,250 a month, and a section of land of 640 acres would be equal to about 420 claims, costing about \$525 a month, or \$6,300 per year. Thus when people have rushed in and taken up a large number of claims, they gradually let go on account of the heavy payments required to hold them.

On commencing to mine, you are required to pay 20s. per claim per month for the claims that you are mining. If the land is not government land, one-half of the payment is made to the owner and one-half to the government. If the government owns the land, the whole of the payments are made to the government. The government claims the right to all of the mineral in the land, only the surface rights being sold. You can never obtain a patent in the Transvaal to any minerals in the land, but must continually pay your claim licenses.

At the beginning of gold mining in the Transvaal, the claim licenses were the only taxes which the mining industry had to pay, but later on Kruger's government, desiring a larger share in the yield of the industry, imposed a tax of 5 per cent. on profits. This was resented by the mine owners—most of the mines at that time being in the hands of English people. Later on when the English government took over the Transvaal, the profit tax was increased to 10 per cent. on the gold mines. Diamond mining is a new industry in the Transvaal, and when the Premier mine was floated it was decided to put a tax on diamonds of 60 per cent. of the profits, in addition to the claim licenses. Later on, after the Transvaal became a self-governing colony, it was decided that no more claims should be proclaimed, and no further pegging out of claims was allowed to take place; instead, a new form of government profit-sharing was devised in addition to the profits already shared by the government.

This new device was to deprive the promoters of most of the promoting profits. When the government proclaimed ground and permitted pegging to take place, if the ground was known to be valuable, those who were fortunate enough to put in their pegs first, and thus to obtain title to the ground, could frequently either sell their claims at once or organize them into a company and obtain large promoters' profits. The government felt that it should share in these promoters' profits. Now, instead of proclaiming the ground for public pegging, the government lays off blocks of ground sufficiently large for a deep-level company, and puts these big blocks up at auction, with certain conditions attached. These conditions specify the amount for which the company can be capitalized and how the capital shall be expended; in addition they specify that a certain amount per ton shall be paid to the government, based on a sliding scale, which amounts roughly to about one-half of the profits.

Two large companies have been organized under these conditions. The firm of Barnato Bros. has offered to the government a larger share of the profits than any other bidder, and has been successful in getting the public to subscribe the money for the enterprise. From time to time the government has of-

ferred further blocks of claims at auction, but has failed to get any bidders. This resulted from the fact that market conditions for Transvaal shares in Europe are not as good as formerly, and the public and the promoting houses do not think that the terms offered are good enough. The socialistic tendencies of the government have been carried to such an extent in South Africa that European brains and capital feel that no incentive is left. The limit has been reached when men of brains and money say that the profits to be obtained under such stringent regulations are not commensurate with the risks to be taken. Even in the Transvaal, the promoter and the share holder must have a large incentive to take the risk.

I believe that the adoption of certain features of the Transvaal law would be of great benefit in the United States, intending to discourage indiscriminate and wholesale staking of claims. An ordinary mining claim in the United States is 20 acres. Under the laws of the Transvaal this would be $13\frac{1}{2}$ claims, for which you would be required to pay about \$16.50 per month per claim, or roughly, \$198 per year apiece, which is twice the amount that is now required for assessment work. Every mining man knows that if at the first of each month every claim owner had to pay \$16.50 to the tax collector for claim license, probably not 10 per cent. of the claims would be held. At the present time, if a United States Government agent were to go into either an old or a new district and attempt to hold the claim owners strictly to their assessment work of \$100 per claim per annum (most of which work is utterly useless), the stranger would soon be run out of camp. A restrictive measure in the shape of a money payment per claim or per acre is, I think, far more effective than is assessment work. The Mexican law (which is similar to the South African) has been found to work remarkably well. If you pay your licenses, you own your claims.

How far we can carry in the United States the socialistic principle of taxing the miner, whether he be mining oil, coal, or metal, is at the present time a subject of great interest. I think that the fact that South Africa has, in the short time since the war, adopted such a policy, demands a closer study of the South African situation by our law makers. The question that we have to consider is, "How much of the incentive can we take away from the capitalist, the promoter, the prospector and the inventor, and still keep him hard at work on his job, without letting him lose his interest, remembering that the slightest decrease in his interest diminishes his efficiency?"

Mr. Weil.—To return to the royalties on oil mining, I do not think any of the oil producers would object to a royalty,

because most of them are paying royalties now. A large part of the land is being operated under leases with royalties of from 10 to 33½ per cent. Even if they do not have to operate under leasehold it has been very usual for a man to locate on a quarter-section of land and then to give a certain proportion of the land to some one else who will spend money and develop the land; in the long run this amounts to about 25 per cent. royalty to be paid by the one who really drills the well.

There is not very much difference between Judge Lindley's views and mine in regard to this matter; it seems to me that if such a plan as he suggests were to be inaugurated it could be successfully administered only by the state in which the land is situated, and that was the point I was endeavoring to make.

I have studied the bills introduced in Congress, referring to which the Director of the United States Geological Survey says the purposes are not royalty, but regulation. In other words, these bills propose to regulate the output of the wells; some of the suggested statutes go so far as to regulate the manner in which a well shall be drilled, and how many shall be drilled; in fact, Senator Smoot's bill gave the government the right to fix the price of oil. Perhaps that is permissible under the doctrine of holding the lands in trust for the common good; but if for the common good, they should be efficiently administered and I do not believe the government can efficiently administer its 700 million acres of land still remaining.

Mr. Lindley.—The government seems to administer its other activities without much friction. I notice that its national reserves and national parks, its Indian reservations, its other activities on the public domain seem to be economically administered and religiously looked after in the interest of the people. The park service has become productive, and, of course, this conservation goes into the other departments. Consider the timber question: The story of what has happened to the timber of the country is a lesson of itself, and a warning; hence the government has tried some rational system to prevent the lumber and the oil industries from continuing as they have gone in the past.

The Chairman.—I feel that a discussion of this subject ought not to end with this meeting, and that in order to put this matter into definite form, our section ought to propose legislation towards a modification of the existing laws governing location of oil land. I have no doubt that the gentlemen with us tonight will be glad to advise in an attempt at constructive legislation. Mr. Requa was made chairman of a committee on this subject,

at our last meeting, for the purpose of bringing forward this discussion.

Mr. Requa.—I was requested to organize a committee and have made some effort to carry out the request. As yet, however, I am unable to report satisfactory progress, owing largely to an unwillingness of people in the oil business to express any opinion on the subject. Many oil producers are occupying disputed land, and can hardly be expected to enter enthusiastically into a discussion of what the government should do with the land that they now claim. I will, however, formulate and submit some recommendations to the next meeting of the section. I will say now, however, that I am firmly of the opinion that the less regulation by the government the better, insofar as the details of the business are concerned.

The questions of water, of line drilling, can be controlled by the various states, and should be regulated. We have a law in this state that ought to take care of the water situation, but unfortunately the water commissioners have no funds at their disposal. If that law were amended so as to put a small tax on every barrel produced, and if that money were put back into the fields in proportion to the oil produced, the water commissioners could do something, but it is not altogether clear in my mind that they will be able entirely to solve this water question. The water is of various origins: There is top water, and bottom water, and included water, that is, water between the upper and the lower sand. I have been told that there are one or two fields in California where it is probably impossible to control the water completely by any measures. The Santa Maria fields offer problems that are probably without any hope of solution. They had a very efficient water commission, which has now gone to pieces, and the water problem in Santa Maria is worse than it has ever been. Because of the shales and the cracks in them, the mere cementing of one well does not solve the question. I think we must agree that no matter how effective an organization we have, it may not be entirely possible to control the water.

Beyond that, when the question of control does arise some privilege must be granted to marketing and transportation companies, allowing for reasonable community of action among themselves. If that condition had existed for the last year and a half, I do not think that the present demoralization in the oil fields could have occurred. As it is today, it is absolutely impossible to secure any harmony between the Standard, the Union, and the Associated companies. If anything successful is to be attempted on the lines of conservation, the plan must, in my opinion, include the granting of permission to transportation companies to

enter a reasonable agreement as to the amount of oil they will take from various companies. At the present time the transportation companies take oil and sell it for what they can get; their charges are fixed, and they get their profits just the same, while the poor producer has to suffer.

The Chairman.—There are two issues here: One is the law of the United States governing locations on oil land, which seems absurd and should be improved. The other is the policing, which can be done by the state. The only matter we are concerned with now is the locating of oil land. My idea is that if we are to get anywhere, this matter ought to be taken up by a committee, which will make a definite report at such time as it finds itself ready. If it is understood that Mr. Requa is to be charged with this duty, and to appoint the committee, that will be satisfactory. But it seems to me that if the Society is to do effective work, we must represent not merely the large producers, the large corporations, but the industry as a whole. But I think we are as well able to judge rightly as to what is good for the people as some of the large corporations, and are more likely to get through a reasonable bill than if they were to propose it themselves. It is understood then that Mr. Requa has charge of this matter with power to appoint a committee from members either of the section or outside of it.

We have with us tonight our esteemed former secretary of this section, Mr. T. A. Rickard, formerly editor of the *Mining and Scientific Press*, and now of the *Mining Magazine*, of London.

Mr. Rickard.—I am very glad indeed to be with you here tonight. I have not ventured to take any part in the discussion because my knowledge of the subject is so scanty. I have taken a trip to Coalinga, which has given me an appreciation of the remarks of Mr. Weil and Judge Lindley. I note with pleasure that the Society is prosperous. When we used to meet, at the beginning, we used to number ten or twelve, but tonight I note a considerable increase. I feel that I planned my visit badly in allowing for it only ten weeks, considering the friends I have here and the length of time it takes to come and go. But I am hoping to be on the first boat that comes through the Panama Canal, and I am looking forward to seeing you then.

The Chairman.—I regret to announce that one of our most honored members, Mr. Ross E. Browne, has had to undergo an operation which resulted in the amputation of his foot on account of an injury he received in a mine some years ago. I would like to have some one move a vote of congratulations on his recovery.

A motion to this effect was made by Mr. Bradley, seconded, and carried.

The Chairman.—We have with us, as a guest, one of my former students, who has just come back from Mexico, and if he will be so kind as to tell some of the things that he told me privately, it will be interesting. I call on Mr. Roger L. Beals to give us an account of conditions in Northern Mexico.

Mr. Beals.—I did not come with any idea of speaking of conditions in Mexico, and I believe many here are just as familiar with present conditions as I am.

The only word to describe the condition in Mexico is "chaos." They have no government in the true sense of the word. People in the United States have treated the revolutionary movement there as a minor issue, and until recently as though it were a kind of opera bouffe. As a matter of fact Mexico is a large country. It has been governed till now in an absolutely despotic manner, although they have a constitution and laws that are as good as ours. They are not a people suited to self-government, due to lack of education and training in government. Under Diaz it was possible to administer the laws and have a government; but after many years of slumbering discontent Madero was able to concentrate this discontent and overthrow the government, owing really to the old age and weakness of those in power. Madero's government went into effect in November. When Madero went in, Zapato was in the southern part of Mexico, operating as a bandit. Madero was a man of education, and more of a European than a Mexican; he attempted to handle the situation and to lead the people as though they were fit for self-government and a reasonable people. He was unable to control Zapato, could not find official places and money sufficient to pay the various leaders who helped to put him in. The new leaders were not fit to handle the country, and the result was that the fighters under Madero found it was easier to foment trouble than to work; in other words, the six months' freedom from work in the first revolution taught them that the easiest way to live was to have a rifle and a horse and saddle and ride around the country, and have three meals a day. Madero could not in three months put through all the reforms that he had promised. Likewise it was impossible for him to inaugurate many other reforms promised in his name, but not by him. In one part and another discontent was stirred up. Bands were formed from the same low class that furnished the men who used to rob the country before Diaz pacified it. There were not enough soldiers in the country to police it. The bandits travel through the country and rob the ranches and small towns. After

they have robbed a town the troops are sent out and report a grand victory. The bandits had taken everything they wanted and left. Almost without exception no attempt is made by these bands to establish government in the towns they take. That is the state of affairs now. So that outside of the large cities there is practically no government whatsoever; there is no authority of any kind. The bandits roam the country and rob at will. They observe no order. They do not observe each other's authority. You can take a permit from the chief of 300 men, and the chief of 50 men will laugh at the passport and simply say, "Well, he got first chance at you;" that is all, and they will take what is left. Now about 90 per cent of the Mexican people are in favor of Madero's government. It is in a chaotic condition to-day, and from present indications it would seem as though they would remain so unless some one comes in from the outside.

Mr. Lindley.—Is there any call for the return of Diaz?

Mr. Beals.—There is today. On the west coast, in Mazatlan and other places, 60 per cent. of the people would welcome Diaz at present. I talked with merchants, with bankers, with farmers, with the small country people, and there is not one who would not welcome the advent of peace under the conditions existing two years before the revolution. They realize the taxes are no different; they had peace and prosperity then insofar as it was possible. At present they have no peace, no security; they are not even able to plant the crops; in fact, in all southern Sinaloa no corn is being planted, and that will mean starvation. This situation is also true of other parts of the country. Those people would welcome a strong man, but not one is now known. Some have been proposed but they represent only small districts or coteries. There is no young man such as Diaz was thirty years ago.

Mr. Bradley.—What will happen to the Americans?

Mr. Beals.—The isolated American should not be down there. As a matter of fact, there are very few places where an isolated American can stay. I know of a few, but they have become naturalized. The few isolated Americans have returned. But wherever ten or twenty Americans are together they have organized into groups. By automobiles or on horseback they can come together and defend themselves for a sufficient time for our troops to reach them in case of intervention. If any isolated Americans attempted to defend themselves they would get into trouble.

Mr. Bain.—What are the other foreigners doing?

Mr. Beals.—They are doing very much the same as the Americans. The attitude of the consuls is very different. The notice sent out by President Taft never reached an American in my district through the American consul, but only through the German or English consuls, although the Americans were registered with the American consul. The majority of the Americans will probably look to the German and English consulates, where they expect not only better and more courteous treatment, but protection.

Mr. Bain.—What protection can they give?

Mr. Beals.—No protection other than that the Mexicans would not feel the same bitterness towards those consuls that they feel towards the American. In the country there is no difference between foreigners, but in the larger cities the German and English consulates would probably be protected.

The Chairman.—As I understand it, the program for the next meeting will be a discussion of the placer law as applied to placer gold mining. Professor Newsom will open the discussion and have the program in charge. That will be the first meeting in May. I think it is well to appoint committees to take charge of matters of this kind, so as to have them brought to a definite issue.

Upon motion, arrangements for the next meeting were left in the hands of the secretary, after which the section adjourned.

H. FOSTER BAIN,
Secretary of Section.

PERSONALS.

R. W. Brock attended the recent meeting of the Mining Society of Nova Scotia, at Halifax.

G. Caetani was recently at Telluride, Colo., inspecting the Tomboy mine and mill.

S. H. Chauvenet was recently stricken with a severe illness, but was reported to be improving in a Reading hospital.

Howard W. Dubois is making arrangements to start hydraulicking gold-bearing gravel at the Quesnelle Hydraulic Gold Mining Company's placer mine in Quesnelle division, Cariboo District, B. C., as soon as the season shall open.

W. R. Ingalls delivered the class-day address at Houghton, Mich., on April 18, for the Michigan College of Mines.

John D. Irving is senior author of Bulletin 478, of the U. S. Geological Survey, recently issued, treating of the geology and ore deposits near Lake City, Colo.

Robert V. Norris gave a course of eighteen lectures of coal mining at Harvard University in December.

A. L. Queneau sailed on April 27 for Belgium, where he expects to remain for the rest of the year.

Prof. Robert H. Richards was recently in Denver, Colo., for a week's professional work. He expected to visit Rolla, Mo., and Hancock, Mich., on his return trip.

F. C. Schrader has completed a preliminary geological examination of the Antelope district, Nevada. Mr. Schrader's report on the Jarbidge, Contact and Elk Mountain Districts of Nevada has just been issued by the U. S. Geological Survey.

S. F. Shaw has been appointed superintendent of the Tiro General mine of the American Smelting & Refining Co. at Charcas, San Luis Potosi, Mexico.

F. L. Sizer has become consulting engineer for the Mascot Copper Company.

M. B. Spaulding is now engineer in active charge of the Calaveritas Consolidated placer mines, near San Andreas, Calaveras county, Cal.

Whitman Symmes, superintendent of the Sierra Nevada and the Union Con. Mines on the Comstock, has resigned from those positions, but continues to manage the Mexican and the Ward shaft.

Pope Yeatman has sailed for Chile and expects to be absent from New York for about three months.

J. B. Tyrrell is to lead the Ontario government expedition into the North to locate the five-mile strip which the province is to receive from the Dominion. Mr. Tyrrell's personal knowledge of the unopened lands of the Hudson Bay district will make his services of great value to the province. One or two surveyors and half a dozen Indians will probably compose the party. Although the route has not been settled, the party will probably proceed first to Winnipeg about the end of May, and thence by Lake Winnipeg to Port Nelson, much of the journey by canoe. At the mouth of the Nelson River, some time will be spent in locating the 10-mile strip, which Ontario will have as a terminus for the Temiskaming & Northern Ontario Ry., should it be decided to extend the line there. The party will then head for the south, and a larger part of the five months will be taken up in exploring the 50-mile stretch along Hudson Bay, anywhere in which the province has a right to choose its five-mile strip.

H. V. Winchell was in New York recently, returning to Minneapolis. He expects to be in New York again about the middle of May, and to sail for Europe.

OBITUARY.

William A. Lathrop, President of the Lehigh Coal & Navigation Co., and Lehigh & New England R. R., died Friday morning, April 12, at the City Hospital, Wilkes-Barre, Penn., following an operation for appendicitis. His condition had been critical for several days, and a number of specialists had been summoned to his bedside.

Mr. Lathrop was 58 years old. He was born in Springville, Susquehanna County, Penn., and acquired his earlier education at the schools of that town. Later, he entered Lehigh University, and in 1875 was graduated with honors as a civil engineer. He afterward took a course in mining and received his degree of mining engineer from the same institution.

For two or three years after his graduation Mr. Lathrop was employed in various minor capacities, both in the anthracite mines and on railroad work in the Wyoming and Lehigh districts of Pennsylvania. He subsequently became assistant to Robert H. Sayre, chief engineer of the Lehigh Valley, and filled this position with great credit for several years. Later, he was associated with Major Irving A. Stearns, of Wilkes-Barre, and for a time took over the management of an iron-mining enterprise in northern New Jersey.

In 1881, when the Southwest Virginia Coal Co. required a superintendent and mining engineer to open up its properties in southwestern Virginia, Mr. Lathrop was selected for the position. He started the mines which have since become the center of the Pocahontas field, and laid out and built the present town of Pocahontas.

After several years of labor against great difficulties in this pioneer work in Virginia, he returned to Pennsylvania in charge of the bituminous mines of the Lehigh Valley Coal Co., at Snowshoe, in Center County, and in 1888 was made superintendent and general manager of all the Lehigh Valley mining operations, succeeding the late Frederick Mercur. Mr. Lathrop remained at Wilkes-Barre in this capacity until 1902, when he resigned to take the presidency of the Webster Coal & Coke Co., operating in central Pennsylvania, and later was made president of the Pennsylvania Coal & Coke Co. When this company leased its mines and lands to other interests, he became president of the Lehigh Coal & Navigation Co., with headquarters in Philadelphia, succeeding Lewis A. Riley.

Mr. Lathrop was a member of the state commission, appointed by Governor Tener, a few months ago, to devise a plan for the protection of the surface of the anthracite region from damage by mine caves. He was a trustee of Lehigh University, president of several coal companies, a director of the People's Bank, of Wilkes-Barre, and of the Fourth National Bank, of Philadelphia, a member of the American Institute of Mining

Engineers, the Mining and Metallurgical Society of America, the Union League, University, Art and Downtown Clubs, of Philadelphia, the Westmoreland Club, of Wilkes-Barre, the Railroad Club of New York, and the Pennsylvania Society of Sons of the Revolution. Although in recent years much of his time was spent in Philadelphia, Mr. Lathrop made his home at Dorrance-ton, near Wilkes-Barre, Penn. He is survived by his wife and one daughter. Mr. Lathrop was a member of the council of the Mining and Metallurgical Society in 1908, 1909 and 1910.

MEMBERS ELECTED IN APRIL, 1912

- Bretherton, Sidney E. 220 Mills Bldg., San Francisco, Cal.
Consulting mining engineer; Gen. Mgr.,
Afterthought Copper Co.
- Guernsey, Forbes W. Bankhead, Alberta.
Asst. Gen. Mgr., Bankhead Mines.
- Oliver, Edwin Letts. 503 Market St., San Francisco, Cal.
Consulting metallurgist; Mgr., Oliver Continuous Filter Co.

CHANGES OF ADDRESS.

- Hellmann, Fred 60 Broadway, New York.
- Huntoon, Louis D. 165 Broadway, New York.
- Leggett, Thomas H. 60 Broadway, New York.
- Payne, Henry M. 42 Broadway, New York.
- Spurr, J. E. 571 Bullitt Bldg., Philadelphia, Pa.
- Wilmot, H. C. . . c/o Colorado Mining Co., Aroroy, Masbate, P. I.

Mining and Metallurgical Society *of America*



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May 31, 1912
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OFFICERS FOR 1912.

President, J. PARKE CHANNING, 42 Broadway, New York.

Vice-President, J. R. FINLAY, 52 William St., New York.

Secretary, } W. R. INGALLS, 505 Pearl St., New York.
Treasurer, }

Executive Committee: Messrs. H. M. Chance, J. Parke Channing, J. R. Finlay, W. R. Ingalls and H. S. Munroe.

COUNCIL.

At large, ex-officio.

J. Parke Channing, 42 Broadway, New York.....Retires January, 1913
 J. R. Finlay, 52 William St., New York.....Retires January, 1913
 W. R. Ingalls, 505 Pearl St., New York.....Retires January, 1913

Districts 1-2-3.—New York and New England.

H. S. Munroe, Columbia University.....Retires January, 1913
 T. H. Leggett, 25 Broad St.....Retires January, 1914
 J. F. Kemp, Columbia University.....Retires January, 1915

Districts 4-5.—New Jersey, Pennsylvania, West Virginia, Ohio and Maryland.

H. M. Chance, Philadelphia.....Retires January, 1913
 F. Lynwood Garrison, Philadelphia.....Retires January, 1915

District 6.—District of Columbia and Southern States.

Waldemar Lindgren, Washington.....Retires January, 1914

District 7.—Michigan, Minnesota, Wisconsin, Illinois, Iowa and Missouri.

H. V. Winchell, Minneapolis.....Retires January, 1914

District 8.—Colorado, Utah and Nevada.

Philip Argall, Denver.....Retires January, 1915

Districts 9-10.—Oregon, Alaska and California, except Los Angeles, Santa Barbara and Pasadena.

H. F. Bain, San Francisco.....Retires January, 1914
 F. W. Bradley, San Francisco.....Retires January, 1915

District 11.—Arizona, Mexico, Texas, Oklahoma and those places in California not included in districts 9-10.

S. W. Mudd, Los Angeles.....Retires January, 1913

District 12.—Montana, Idaho, Washington and Canada.

C. W. Goodale, Butte.....Retires January, 1913

OFFICERS OF SECTIONS.

NEW YORK.

SAN FRANCISCO.

S. B. Christy,
Chairman.
 H. F. Bain,
Secretary,

Geo. C. Stone,
Chairman.
 F. G. Spilsbury,
Vice-Chairman.
 Louis D. Huntoon,
Secretary.

PHILADELPHIA.

R. H. Sanders,
Chairman.
 F. Lynwood Garrison,
Secretary.

Mining and Metallurgical Society of America

Vol. V

May 31, 1912.

No. 5

ANNOUNCEMENTS.

Badge.—The badge of the Society, officially adopted by the council, may be obtained from the Secretary at a cost of \$5 when made in gold, silver and blue enamel; \$20 when made in gold, platinum and blue enamel. The badge may be obtained either as a pin or as a watch-charm. In ordering, be particular to state which form is wanted.

Bound Volumes.—Bound volumes of the Bulletin of the Society for 1911 may be obtained from the Secretary for the price of \$1.50. Any member desiring a complete set of the bulletins for 1911 unbound can obtain it, free of charge, by application to the Secretary.

Changes in Address.—Members are requested to notify the Secretary promptly of changes in address.

W. R. INGALLS,
Secretary.

COUNCIL.

A meeting of the council of the Mining and Metallurgical Society, of which notice was given to all members on April 23, 1912, was held at the Engineers' Club, New York, at 5 p.m. Thursday, May 16. The members present were Messrs. Chance, Finlay, Ingalls, Kemp and Munroe, these constituting a quorum. Mr. J. R. Finlay, vice-president, took the chair. The Secretary reported that ballot No. 28, comprising the names of F. W. Guernsey, Edwin Letts Oliver and Sidney E. Bretherton, was canvassed by him on April 15. The total number of ballots cast was 15. There were no adverse votes, and all the candidates on the list were declared elected and were notified of their election.

The Secretary presented the following communication:

Salt Lake City, Utah, March 12, 1912.

W. R. Ingalls, Secretary, Mining and Metallurgical Society, New York.
Dear Sir:—Referring to the formation of committees of the Society

to take charge of certain subjects, I would suggest the appointment of one to consider the welfare of the mine and metallurgical employee. The field is an extensive one, and is destined before long to be forced upon our attention.

Your very truly,
L. S. AUSTIN.

It was moved and seconded that a committee of three members to consider the welfare of the mining and metallurgical employee be appointed by the President of the Society. This motion was unanimously carried.

It was moved and seconded that the office of Editor of the Society be created, the incumbent not necessarily to be a member of the Society, this officer to be appointed and dismissed by the Secretary, and his salary to be fixed by the Secretary, subject to the approval of the Council.

The Secretary explained that this motion was offered merely to regularize what is the present custom. While the Secretary is theoretically the editor of the bulletin, the actual editing is necessarily done by an assistant. The Secretary desired to be relieved from the nominal responsibility which he could not fill.

The motion was unanimously carried. The Secretary then announced the appointment of Mr. Edward K. Judd as editor of the Society at a salary of \$10 per month. Upon motion, duly seconded, this appointment and the fixing of salary were approved.

The Secretary presented a report by the committee on gold medal as follows:

April 10, 1912.

Mr. J. Parke Channing, President, Mining and Metallurgical Society of America.

Dear Sir:—The undersigned were appointed a Committee to frame regulations for the award of a gold medal by this Society and beg to submit the following report:

Your Committee has made careful study of the rules and practice governing the award of similar medals by other societies and has endeavored to make use of these precedents as a guide in framing regulations for our own Society.

The Constitution of our Society outlines five objects, namely, the conservation of mineral resources, the advancement of mining and metallurgical industries, the better protection of mine investors and mine workers, the increase of scientific knowledge, and the encouragement of high professional ideals and ethics. The membership of the Society includes mining and metallurgical engineers and geologists and under each of these heads our members cover many special fields of work. It is evident at the outset that it would be difficult, if not impossible, to decide between the merits of the gentlemen who may have fairly earned recognition by this Society with so many objects and so many different lines of work to be considered.

In view of the above your Committee recommends that the medal

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be awarded each year for different kinds of service to the profession and to the community and as a basis for such award suggests the following tentative list:

1. For services contributing to better protection of mine workers.
2. For work tending to safeguard the interests of mine investors.
3. For distinguished work in the field of economic geology.
4. For notable contributions to the science of coal mining.
5. For notable contributions to the science of metal mining.
6. For notable contributions to the science of ferrous metallurgy.
7. For notable contributions to the science of non-ferrous metallurgy.

It is recommended by the Committee that each year the Council shall invite the members of the Society to suggest the specific object for which the medal shall be awarded and shall ask them to nominate persons who may be entitled to recognition. The nominations should not be confined to members of the Society and should include other nationalities than our own. Nominations by members should be accompanied by detailed statements of the claims of the candidates for consideration. On receipt of these recommendations the Council shall determine the specific object for which the medal shall be awarded. A Committee should then be appointed by the President to consider all nominations. The Committee should make a detailed report and submit a list of not less than three names to the Council for election by letter ballot. For election a candidate should receive not less than four-fifths of the vote of the council, several ballots being taken for the purpose if necessary. In order to carry these suggestions into effect the Committee begs to submit the following rules:

1. A gold medal shall be awarded by this Society each year for conspicuous professional or public service for the advancement of the science of Mining, of Metallurgy, or of Economic Geology; for the betterment of the conditions under which these industries are carried on, for the protection of mine investors, and especially for the better protection of the health and safety of workmen in mines and metallurgical establishments.

2. This medal shall be awarded at the annual meeting of the Society in January.

3. Six months before the award the Secretary shall send a circular letter to all members requesting suggestions as to the specific object for which the medal shall be awarded and asking for the nomination of candidates on a form provided for the purpose, such nominations to be accompanied by a full statement of the claims of the candidates for consideration. These nominations shall not be confined to members of the Society and may include other nationalities than our own.

4. Three months before the award of the medal the Council shall determine the specific object for which the medal is to be awarded. All nominations of candidates whose claims to recognition lie in that special field of work shall then be considered by a Committee of three to be appointed by the President. At least one month before the award this Committee shall submit a list of not less than three names to the Council with full statement of the claims of each candidate. The Committee may consider and recommend names not nominated by members of the Society. The names so recommended shall be submitted to the Council for election by letter ballot.

5. For the election of a candidate a majority vote of four-fifths of the Council shall be necessary. If this majority be not obtained on

the first election other ballots may be taken either by letter or at a meeting of the Council called for the purpose. At such meeting members of the Council may be represented in proxy.

Respectfully submitted,

HENRY S. MUNROE, *Chairman*,
ARTHUR L. WALKER,
J. F. KEMP.

Upon motion, duly seconded and unanimously carried, the report of the committee on gold medal was ordered to be placed on the calendar for consideration at the next meeting of the council and the Secretary was directed to print it in the next number of the bulletin of the Society.

There being no further business the meeting was adjourned.

W. R. INGALLS,
Secretary.

MINUTES OF MEETINGS.

NEW YORK.

The May meeting of the New York section was held, after an informal dinner at the Chemists' Club, on Thursday, May 16, at 8.15 p.m. In the absence of Mr. Stone, the meeting was called to order by E. G. Spilsbury. Those present were: A. F. Bennett, H. M. Chance, T. France, J. R. Finlay, Louis D. Huntton and guest, W. R. Ingalls, H. S. Munroe, Robert Peele, M. B. Spaulding and guest, D. M. Riordan, Mr. Van Winckle, and W. Y. Westervelt.

The Chairman.—The minutes of the April meeting will stand adopted unless there are any objections. (No objections were offered.) The topic for this evening is the valuation of mining properties. I will ask Mr. Finlay to read us his contribution to this subject.

J. R. Finlay.—I have prepared this paper in response to an invitation by the Secretary, believing that it was to be merely an introduction to the discussion.

The central ideas, which I suppose are generally adopted by mining engineers in their conception of the value of mines, are due to Mr. H. C. Hoover. One of Hoover's main propositions is that a mine is a limited deposit of valuable ore, and that to make the greatest profit from it requires that the deposit be worked out rapidly. The main factor in this proposition is the time value of money: not only the money tied up in the investment, but of the money to be returned by the investment.

It follows that the true interest of a mine owner is not to perpetuate an income, but to complete a job; not to prolong the life of his mine, but to shorten it by exhausting all profitable ore and getting the money into something else just as soon as economy will permit. Good economy, by Hoover's theory, demands that the ore reserves be ruthlessly slashed by getting out the best ore first, in preference to poorer ore, there being no logical reason why any absolute profit should be sacrificed in order to make a showing of stability. These conceptions are rather shocking to the average investor, with whom stability of earning power is a kind of fetich. Such a man will understand the proposition easily enough, but he is bound to realize the technical character of the mining business and is pretty sure to distrust his limited knowledge of its details. Hoover's style of reasoning is strictly for mining men, or at least for men in a position to appreciate the real facts about a mine. Moreover it was proposed in the first instance to apply only to gold mining—a form of enterprise from which some of the ordinary commercial factors have been eliminated because gold can always be marketed without limit at a fixed price.

Those of us who have imbibed these principles, of course understand that the mere annual income of a mine may mean very little in the problem of estimating its total value. We want to know the facts about the ore. We want to know how much profit is already assured and how much is the ultimate possibility. It then seems reasonable to believe that the real value of a mine lies between a certain minimum and a certain maximum. I fully believe that mines can be reasonably valued in this way. I am not able to see any reason why a mining engineer should not expect to understand commercial facts, and it occurs to me to point out the great importance of strictly commercial data.

Certain dopesters, whom we mining engineers may hastily call commercial quacks, often assure us that the valuation of mines by mining engineers is a cold, pale, and spiritless calculation, which is like poisonous gas to vital enthusiasm and will surely kill any enterprise that breathes it. We are perhaps disposed to grow indignant at these sneers, but I think we are forced to admit that the valuation of a mine, or the valuation of anything, depends on a number of factors in regard to which opinions of equally competent men are pretty sure to differ. There are plenty of cases in which strictly commercial questions, such as the price of a commodity or the value of money, or perhaps the mere demand for securities, or the value of some commercial strategic point, may outweigh the importance of the ore reserves. A mining engineer may be at quite a loss as

to how to weigh some of these facts, and his idea of value may be inferior to that of men who consider only commercial conditions. Furthermore, people attach enormous value to things which any hard and fast scheme of appraisal must leave quite out of the reckoning. Look at city real-estate, for instance. Nearly all of it, unless built upon and utilized, is held at a great annual loss instead of a profit. Much of this land never will be utilized for any profitable purpose, but one would be foolish indeed to call it worthless. The fact is that it can be sold and it is always possible to borrow money on it. It seems to me that undeveloped mineral lands must be valued exactly as unused real-estate is valued—at so much an acre, according to the prices fixed by mere trading. There is apparently no other basis.

When we come to going concerns, I have always assumed that we have a series of factors as follows: (1) The average cost of the product. (2) The average price of the product. (3) Variations introduced by temporary fluctuations in prices. (4) The general tendency of prices in the long run. (5) The expected life of the mine. (6) The interest rate on invested money. It goes without saying that scarcely any of these factors is capable of being fixed with exactness. Of the whole list, the one factor which we generally consider to be the hardest to determine is the very one which is capable of being determined with the greatest exactness: I mean the amount of ore in a mine. While this is often exceedingly uncertain, we all know of instances in which it is absolutely measureable.

The average cost is not easily determined, and of this fact there are some capital examples in sight right now. The other factors are so uncertain that no two men will agree upon them. Take the question of probable prices for a given staple. All you have to go on are the facts of the past, and upon these it is almost always possible to put contradictory interpretations. Even past averages of prices apply only to a given term of years, and for each separate term you will get a different average. To project calculations into the future from this unstable base line is dangerously near pure guess-work.

What I think we sometimes forget is the enormous importance of the guess. In innumerable cases a difference of ten per cent. in the price of the product will make more difference to the value than any possible uncertainty about the life of the mine. This applies to every kind of a mine except a gold mine. I have a case in hand now, a very important mine earning well over a million dollars a year. It is surely good for ten years' life, and I believe that it is good for 20 years. If it lasts 20 years this mine will be worth say, \$12,000,000; if it lasts only ten years it will

be worth \$7,500,000. If, however, the price of its ore falls 11 per cent. it will be worth only \$7,500,000 if it lasts the full 20 years. If, on the other hand, the price rises 11 per cent. it will be worth well over \$10,000,000 with ten years' life. You will observe that the differences in the price are no more than two men might readily disagree about. For instance, it is a difference about equal to that between 13½c. copper and 15c. copper.

How often do we stop to consider these most evident facts? Here is a little difference, well within the possibilities which is more important than six or seven million tons of mighty good ore. There are a number of other variables, one of which is the value of money, but I shall not attempt to discuss them. My point is that in trying to place values upon mines we should be very cautious not to overestimate the importance of purely technical information.

The Chairman.—You have heard the interesting paper by Mr. Finlay. The question is now open for discussion. I think, myself, that the price of the product, to be taken into consideration in estimating the value of a property, is of course a very important question, but Mr. Finlay, I think, lays too much stress upon it. In making an estimate of a property, what we aim to ascertain as near as we can is the actual value at the time; thus if in estimating the value of the ore we take an average of the fluctuations that have occurred within a number of years, we can prophesy pretty closely what is to be expected in the future. The very high prices of copper, that is to say above 15c., have so far, in our experience, never lasted over a few months at a time; while of course during those few months the value of a property has greatly increased, it is not a permanent increase, and the value would be offset by a corresponding low valuation of the ore later on.

Robert Peele.—Confining the discussion to mines in which the value of copper would be an important factor leads me to say that within the past two years I have constructed a curve of copper prices from 1861 to date, and the curve is an interesting one. The variations are very great from one period to another, and there is so little system in the ups and downs of the curve that I am inclined to think it is impossible to predict what the future will bring forth.

J. R. Finlay.—Just to add to what Mr. Peele says I will relate a little of my own experience. Some two or three years ago I thought I would venture to predict the future price of copper at 15½c., taking into consideration the fact that the bottom was reached in 1894, and that since that time more or less

of a rise has been evident. I made that approximation on the basis of a progressive increase of price, as shown by the bottom price during the depression, each succeeding depression being a little higher, or failing to get as low as the previous one. That was all well enough for academic work, but when I went to appraise the Michigan mines last summer I found the price at the time of handing in my report to be $12\frac{1}{4}c.$ Turning to my old figures, while it perhaps would be a good guess to figure on $14c.$ as a fair price, I did not have the nerve to venture to go from $12\frac{1}{4}c.$ to $15\frac{1}{2}c.$ I think you can see that the difference would be of far greater importance in the valuation of mines in which there was any uncertainty about ore reserves.

The only way you can ever arrive at a conclusion is to take the negative standpoint. How low a price can the operation stand for? You can produce for a certain figure, and you must allow a certain amount for depreciation; what you can make above that total is profit.

Robert Peele.—It seems probable that copper mining stands almost alone in its peculiar dependence on the market.

E. G. Spilsbury.—Iron and zinc are the same, especially the Joplin prices. They range from \$37 to \$60 a ton.

J. R. Finlay.—Tin presents the peculiarity of a metal permanently increasing in value, and in that respect it is the reverse of silver which seems to have permanently decreased in value.

E. G. Spilsbury.—Lately silver has gone over $60c.$ The value of silver went below $50c.,$ now it is up to $61c.$ per ounce.

J. R. Finlay.—Historically, the comparative value of silver and gold started back in the Roman and Greek times, at ratio of about 10 or 12 or perhaps 14 to one. Then it settled down for a long time, several centuries, to 15 or 17 to one in favor of gold. That continued until about 1875, when a slow decrease in the value of silver prevailed until about 1893. Then the price of gold, as compared with silver, rose to about 40 to one, and has fluctuated between 30 and 40 to one ever since, which seems to indicate a great cheapening of silver.

E. G. Spilsbury.—It seems to me that in making a valuation of a property it is impossible for an engineer to arrive at figures that would take into consideration fluctuation in the market prices of metals. He can assume a certain price and then make it clearly understood that profits will fluctuate with the value of the products, but I do not think you can base a real valuation of

a property on any range of prices obtainable during any period of time.

R. Peele.—The custom among a good many engineers in valuing copper properties is to conclude their reports with a statement of valuations based on a series of different prices of copper, which probably is as good a way as can be devised.

H. S. Munroe.—The question of the price of metals is not to be solved by a study of averages or from curves of past prices, but is determined by economic laws, which are founded upon a very large number of varying conditions, but few of which can be predicted with any certainty. So, while I agree with Mr. Finlay that prices have weight in estimating the value of a property, we ought not to overlook, at the same time, that it is a little beyond our province to fix, or to even suggest, any definite figure which is likely to prevail in the future.

D. M. Riordan.—My observation has been, in trying to arrive at the value of a property, that while there is a great deal of truth in what Prof. Munroe says about prophesying, nevertheless a client, an intending purchaser, a developer, or a re-developer, wants to know, and feels that he is entitled to receive some opinion from a man for whose training and judgment he is paying. History does not interest him, as a rule. He won't give a dollar a mile for ancient history. What he wants to know is what the mine is going to do in the future.

In trying to arrive at what the price of copper would be, I ventured one of those dangerous predictions and stated that in my judgment the copper output of the world would sell in the open market, on the basis of 900,000 tons, at 13c. I meant exactly that, and all that implied. That if the copper output were less than 900,000 tons, then it would sell higher. As a fact, the copper output surpassed my prediction as to quantity. I took for one of my fundamental assumptions that the year's production and consumption were synonymous terms, because there was not two months' visible supply in the world that was available in the markets.

In 1910 I cast predictions ahead again and arrived at 15c. as my average price. I stood to 15c. copper and stated that we would surely get that price before January 1, 1913. Some of those who had equal facilities arrived at the conclusion that 11c. copper would prevail. They are paying 16¼c. today. It is a process of taking your facts and digesting them, and then arriving at your conclusion. When I say digesting I don't mean pigeon-holing. I mean assimilating as well as taking them in.

In my method of estimating I took into consideration two factors that probably have been overlooked. One was the almost imperceptible loss in copper by friction alone. My estimate is that it amounts to 5 per cent. of the total world's output. The increase in consumption is running about 8 per cent. There is another element of loss that would have to be estimated; the spraying of fruit trees consumes more copper than the General Electric Company uses. Copper happens to be a spectacular as well as a useful metal. When stocks are up, and everybody is feeling good, the public is likely to go into enterprises that will consume copper. If weather is bad they will use some other metal as a substitute.

An engineer trying to arrive at the probabilities as to the value of metal extending over a period of years approximately equal to the life of the ore reserves, has got to forecast along world wide and not along local lines. He has got to arrive at conclusions satisfactory to himself as to what the probable world's use of the metal is going to be for the next 10, 15, 20 or 50 years, as the case may be.

W. R. Ingalls.—If an engineer is examining a mine on behalf of people who are going into it as a speculation, it might answer the purpose for him to figure what the profit might be at 12-17c. copper, similarly on a scale as to lead, or as to spelter, but if he were valuing a mine on behalf of bankers who were going to loan a million dollars such a scale would not suit. They would want a more exact valuation. The engineer valuing mines has to be something of an economist.

D. M. Riordan.—Is it your idea, Mr. Finlay, that an engineer should ignore all possible future discoveries?

J. R. Finlay.—By no means. If a mine is 1000 ft. deep, and is fully developed to that depth, and shows as good ore as it showed at the surface, and as much of it, or more, it seems to me that you should allow for its continuation.

H. S. Munroe.—In connection with the subject of mine valuation, some charts which I use in my lectures on the subject at the School of Mines may be of interest to the members of this Society.

The first of these charts is intended to emphasize the importance of taking into account the specific gravity of the ore in obtaining average values from a series of samples. For the purpose of illustration I assume five samples taken at uniform distances in a galena vein, varying in thickness from 10 to 60 in. and the ore varying from 10% to 80% of lead.

Thickness, Inches.		Percent. Lead.		Inch— Percent.
60	×	10	=	600
20	×	40	=	800
50	×	25	=	1250
10	×	80	=	800
10	×	60	=	600
<hr/> 5/150		<hr/> 5/215		<hr/> 150/4050
Averages	30 in.	43.0%		27.0%
		(Arithmetical)		(Volumetric)

Calculating the average in the usual way by multiplying the thickness in inches by the per cent. in lead and dividing by the total number of inches, we find for our average value 27%, which we may call the volumetric average. This is less than the arithmetical average, which in this case is 43%. Neither of these results, however, is correct, as the values obtained from sampling must be given weight in proportion to the tons of ore which each sample represents. In the following table I have introduced specific gravity as well as thickness.

Thickness, Inches.		Specific Gravity.		Inch- Gravity.		Percent. Lead.		Inch- Gravity- Percent.
60	×	3.0	=	180	×	10	=	1800
20	×	5.0	=	100	×	40	=	4000
50	×	4.0	=	200	×	25	=	5000
10	×	7.5	=	75	×	80	=	6000
10	×	6.0	=	60	×	60	=	3600
<hr/> 150				<hr/> 150/615				<hr/> 615/20400
				4.1				33.17
				Average Spec. Grav.				Average Percent.

If we multiply the thickness in inches by the specific gravity of the sample, we obtain a product which we may call the inch-gravity value, which is a unit proportional to the tonnage represented by the sample. Multiplying this by the per cent. of lead found by assay we get an inch-gravity-per-cent. product. Dividing the sum of these last products by the total of the inch-gravity column we obtain as the average per cent. 33.17, which lies between the volumetric and the arithmetic average. This we may call the gravimetric average.

The following example illustrates the necessity of pursuing the same plan when dealing with a gold or silver ore in which the gangue consists largely of heavy sulphides.

VOLUMETRIC (USUAL) METHOD.

Thickness Inches.		Value Per Ton.		Inch- Dollar.
15	×	2.00	=	30.00
10	×	1.00	=	10.00
5	×	12.00	=	60.00
3	×	20.00	=	60.00
2	×	15.00	=	30.00
<hr/> 5/35		<hr/> 5/50.00		<hr/> 35/190.00
Averages	7 in.	\$10.00		\$5.43
		(Arithmetic)		(Volumetric)

GRAVIMETRIC METHOD.

Thickness, Inches.		Specific Gravity.		Inch- Gravity.		Value Per Ton.		Inch- Gravity Value.
15	×	2.6	=	39	×	2.00	=	78.00
10	×	2.8	=	28	×	1.00	=	28.00
5	×	3.8	=	19	×	12.00	=	228.00
3	×	4.0	=	12	×	20.00	=	240.00
2	×	3.5	=	7	×	15.00	=	105.00
<hr/> 35		<hr/> 35/105		<hr/> 105/679.00				
Averages		3.0						\$6.47
		Spec. Grav.						Gravimetric Average.

The volumetric average obtained by the inch-dollar basis is \$5.43; the real average value based on tonnage will be \$6.47.

In both cases it will be seen that the errors that result from neglecting the specific gravity of the ore may be serious. The specific gravity of the different samples may be readily determined by the bottle method, using for this purpose material from the portions of each sample which are rejected when crushing and working down the mine sample to the usual bottle sample for assaying.

I shall also call the attention of the members to the use of the well-known formula for determining the probable error of the arithmetical mean of a number of observations. The use of this formula for the study of sampling data will give us valuable information as to the accuracy of the final result and enable us to deal intelligently with high assays.

If n = number of observations, and d = difference of each from the arithmetical mean, then the

$$\text{Probable Error} = 0.6745 \sqrt{\frac{d_1^2 + d_2^2 + d_n^2}{n(n-1)}}$$

In the Transactions of the Institution of Mining and Metallurgy for January, 1907, Mr. E. H. Garthwaite has given some interesting results from the sampling of a gold mine in Rhodesia. In one case, the second example cited, 71 samples were taken at 2-ft. intervals. A summary of these results, as given by Mr. Garthwaite, is as follows: It will be noticed that there are a number of high assays and, apart from this, that the range in values is very great.

SUMMARY OF ASSAY RESULTS.

Assay Value.	No. of Samples.	Assay Value.	No. of Samples.
0-5 dwt.	13	50-75 dwt.	6
5-10 "	17	75-100 "	5
10-20 "	17	100-200 "	3
20-30 "	3	200-300 "	1
30-40 "	5	300-700 "	none
40-50 "	none	700-800 "	1
			<hr/> 71

Including all assays, the average value is 43.35 dwt. Applying the formula we find a probable error of plus or minus 8.15 dwt., that is, the value lies somewhere between 35.20 dwt. and 51.50 dwt. If we omit the one high assay, which lies between 700 and 800 dwt., the average of the remaining 70 samples lies between 31.08 and 33.49 dwt., or, say, 32.29 dwt., or somewhat less than the lowest probable value. Even omitting this high assay, the probable error is plus or minus 4.16 dwt., which still leaves much uncertainty as to the real value of the ore. It is evident in this particular case that the mine is very spotty, and that a safe average value can be obtained only by increasing the size of each sample or the number of samples taken. If large samples had been taken it is possible that the variation in value would have been less and the probable error much smaller.

Mr. Garthwaite made some interesting comparisons of results that would have been obtained with other sampling distances. For example, taking every alternate sample in the mine he obtained two sets of results for a 4-ft. sampling interval. By taking every third sample he obtained three results, which would have been obtained by sampling at 6-ft. intervals. By taking every fourth sample he obtained four sets for an 8-ft. sampling interval, and in a like manner, by taking every fifth sample he obtained five different values for the mine with a sampling distance of 10 ft. These results were as follows:

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Sampling Distance.	Average Value.	Average Width.	Sampling Distance.	Average Value.	Average Width.
Ft.	Dwt.	In.	Ft.	Dwt.	In.
2	43.35	32.0	8	22.74	32.0
4	35.16	32.0	10	20.26	32.5
4	50.84	32.5	10	90.37	30.0
6	28.17	32.0	10	44.85	30.0
6	66.57	29.5	10	29.97	34.0
6	33.52	33.0	10	29.87	32.0
8	35.13	31.0	Independent Sampling.		
8	79.34	32.0	10	14.60	35.3
8	33.18	33.0	10	16.00	32.0

Making the proper substitutions in the formula we find the probable error in each case as follows:

Sampling Distance.	Samples Taken.	Average Value.	Probable Error	Extreme Values.	RESULTS OBTAINED.
Ft.		Dwt.		(Theoretical)	
10	15	43.35	± 17.74	25.51 — 61.09	14.60 — 20.26 — 29.87 — 29.97 — 44.85 — 90.37
8	18	"	± 16.42	26.93 — 59.77	22.74 — 33.18 — 35.13 — 79.34
6	24	"	± 14.12	29.23 — 57.47	28.17 — 33.52 — 66.57
4	36	"	± 11.45	31.90 — 54.80	35.16 — 50.84
2	71	"	± 8.15	35.20 — 51.50	43.35 Sampling distance actually used.
1	141	?	± 6.12	37.23 — 49.47	28.6% Probable variation.
0.5	281	?	± 4.10	39.25 — 47.45	18.7% " "
0.25	561	?	± 3.10	40.25 — 46.45	14.3% " "

Comparing the theoretical range of values it will be seen that with the 10-ft. sampling interval the values actually obtained in the mine ranged from 14.60 dwt. to 90.37 dwt. The error of the mean is only a probable error; therefore, the actual error is certain to be more than this probable error in some cases. The same will be observed in the case of the probable and actual errors in the 8-ft. sampling interval, although the number of results being small, the variation is not so great. The 6-ft. sampling interval with only three results shows a very close correspondence with the theoretical values. The 4-ft. sampling interval with only two results does not reach the theoretical extreme values. We may extend the application of the formula by computing the probable results for 1-ft., 6-in., and 3-in. sampling intervals. Under the last supposition 561 samples would have been taken, forming a sample practically continuous, but even in this case the values would range from 40.25 dwt. to 46.45 dwt., or a range of 14.3% if referred to the 43.35 dwt. average.

W. Y. Westervelt.—I once had to go over the sampling of a copper mine in which the results were from a trace to 5 per cent. copper. If I recollect correctly, I sampled over 1,000 ft. of drifts. The sampling originally was at 10-ft. intervals, by cutting a trench yielding a sample of 15 lb. Not that I objected

to this method, but to check by some other method, I decided to engage Mexicans and hew off a sheet on each side. I then set Mexicans to work quartering down and so on. Taking the samples at every 5 ft. and comparing them, the results were striking. When I took the samples all together I found that the variations were out in the hundredths place in decimals. My valuation was identical, although a totally different method was employed.

H. S. Munroe.—Mr. Krumb of the Utah Consolidated told me he took 4,000 samples, that the previous owners had taken 8,000 in daily work, and that the two results agreed within about .06 per cent.

J. R. Finlay.—It is strange that in almost every case of those porphyry mines, or of any other mines, that the sampling of the ore as sent to the mill does not check with the sampling of the ore in place. The ore as it goes to the mills is invariably lower, a rough estimate of the difference being about 20 per cent.

E. G. Spilsbury.—I was one of the first at the Utah Copper, and I took about 2,700 samples. The average of the whole was 1.983 per cent. The result of their work in the mill during the same period was 1.982 per cent. The variation was remarkably slight. At that time the ore going to the mill was taken out in development work.

W. Y. Westervelt.—Mr. Aldridge told me a few weeks ago that the Ray mill assay varied about 5 per cent.

E. G. Spilsbury.—One element omitted in estimating the value of a mine, and one becomes a very important factor, is the value to be put on the engineer in charge of operations. How are you doing to estimate that?

J. R. Finlay.—You cannot estimate it. We all know that different managements vary in efficiency to an extent that can be demonstrated only by a change of management.

The meeting then adjourned at 10.30 p.m.

L. D. HUNTOON,
Secretary of Section.

PERSONALS

Alfred H. Brooks delivered a lecture on May 6 before the New York Academy of Science, Section of Geology and Mineralogy, his subject being "The Geology and Mineral Resources of Alaska."

Frederick G. Cottrell of the Bureau of Mines visited metal-

lurgical plants in Denver, Leadville, Salt Lake City and Ely on his return west from New York and Washington.

J. R. Finlay delivered the commencement address before the Missouri School of Mines on May 31.

The report of William Griffith and Eli T. Conner, who conducted the investigations into mining conditions under the city of Scranton, has just been issued by the U. S. Bureau of Mines. It includes a preface by J. A. Holmes and a chapter on sand for mine flushing in the Scranton region, by N. H. Darton.

Edwin C. Holden intends to make a professional trip to Montana, Idaho and Utah in June and July.

Waldemar Lindgren delivered an illustrated lecture before the Mining Society of Sheffield Scientific School, Yale University, Tuesday, April 23, on "California Gravels."

Henry M. Payne has become associated as mining and metallurgical specialist with the firm of Stephen T. Williams & Staff, at No. 346 Broadway, New York. He expected to leave New York about the end of May for the Yukon goldfields, and to return late in the summer.

F. L. Ransome has been studying the mines in the Miami district, Arizona.

T. A. Rickard recently delivered a series of lectures to the students of McGill University on the "Valuation of Mines." He later attended the meeting of the Canadian Mining Institute, where he delivered an address upon the same subject. He then left for San Francisco, visiting New York in April on his way back to London. His lecture was repeated at Columbia University.

Reno H. Sales has been elected a vice-president of the Montana Society of Engineers.

Walter Harvey Weed announces that the firm of Weed & Probert having been dissolved he will continue in practice as consulting engineer and mining geologist, with offices at 42 Broadway, New York.

CHANGES OF ADDRESS.

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Mining and Metallurgical Society *of America*



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Mining and Metallurgical Society of America

Vol. V

June 30, 1912.

No. 6

ANNOUNCEMENTS.

Badge.—The badge of the Society, officially adopted by the council, may be obtained from the Secretary at a cost of \$5 when made in gold, silver and blue enamel; \$20 when made in gold, platinum and blue enamel. The badge may be obtained either as a pin or as a watch-charm. In ordering, be particular to state which form is wanted.

Bound Volumes. Bound volumes of the Bulletin of the Society for 1911 may be obtained from the Secretary for the price of \$1.50. Any member desiring a complete set of the bulletins for 1911 unbound can obtain it, free of charge, by application to the Secretary.

Changes in Address.—Members are requested to notify the Secretary promptly of changes in address.

W. R. INGALLS,
Secretary.

MINUTES OF MEETINGS

NEW YORK.

The June meeting of the New York section was held, after an informal dinner at the Engineers' Club, on Wednesday, June 19, at 8 p. m. Those present were: J. P. Channing, J. S. Douglas, W. R. Ingalls, H. H. Knox, W. W. Mein, E. G. Spilsbury, M. B. Spaulding, L. D. Huntoon and F. Naething.

No subject had been assigned for discussion as the indications were that most of the members were out of town, and the talk, after dinner, was of an informal character. On motion the meeting was adjourned.

LOUIS D. HUNTOON,

Secretary of Section.

SAN FRANCISCO.

A meeting of the San Francisco section was held at the Hotel Sutter on Monday evening, May 6, 1912. Prof. S. B. Christy occupied the chair. Those present were: H. F. Bain, Albert Burch, R. C. Beals, S. B. Christy, F. G. Cottrell, A. A. Hanks, M. H. Kurlya, A. C. Lawson, C. W. Merrill, E. L. Oliver, W. A. Prichard, M. L. Requa, T. T. Read, and F. L. Sizer.

The Chairman.—The meeting this evening is to hear a report of the committee on proposed legislation concerning government restrictions in oil land. Mr. Requa is chairman of that committee.

Mr. Requa.—In endeavoring to formulate this report to meet the ideas of all concerned, I have discovered that few have the same ideas as to what should be done with Federal land now withdrawn from entry for oil purposes. There are, however, some points upon which all are agreed; I will take those up first so that if you care to discuss them you may, and I will then take up the debatable points.

1. "There are no laws at the present time under which oil land can be satisfactorily acquired." I have not found anybody who dissented from that opinion.

2. "A new law should be enacted dealing strictly with oil lands now withdrawn from entry, or lands which are not now considered oil-bearing but may later be found to contain oil." Everyone with whom I have talked in the oil business has agreed that there ought to be some very definite law on the subject.

When we get that far we come to the parting of the ways; one man wants one thing and another wants another. So I have formulated some suggestions that in a measure meet with my own approbation, though perhaps they do not please anybody else. In the first place, I think that this law should provide, among other things, the following:

(a) "From time to time, as the exigencies of the market may demand, in the opinion of the Secretary of the Interior, oil, gas, and asphalt lands shall be thrown open to entry in blocks of such size as he shall determine." I met objections right there. The suggestion was made that this would have a tendency to create monopoly and would place too much power in the hands of the Secretary; that whatever laws were passed, oil land should come under it without any restriction on the part of the Department. I do not concur in these suggestions, because I do not think there is any way by which conservation can be made to conserve better than by restricting entries until such time as the oil

or the asphaltum is actually needed. Without such restriction the idea of conservation is largely destroyed because if entry is permitted on all land there is no way of conserving it. So I think that this should be one of the foundations of the structure—a proviso that only such land shall be thrown open at one time as the necessities of the situation demand.

Next we come to a proposal outlined by Judge Lindley, in which I heartily concur, which he states much better than I can.

(b) "A proposed locator of lands supposed to contain oil should initiate his right by application to the commissioner of the land office, specifying the tract by Government subdivision, if lands are surveyed. If not surveyed, they must be staked in rectangular form, conforming to the system of public land surveys, and described by metes and bounds. This application should be filed with the registrar of the land office, and notice of the filing be recorded in the county recorder's office. The registrar should note the application on his tract books, and until the commissioner acts upon the application the land should be withdrawn from all other kinds of entry and location. Upon favorable action by the commissioner, the locator must within a specified time commence drilling, and thereafter prosecute continuously the drilling of the well."

3. "Upon the discovery of oil in commercial quantities a locator shall be entitled to a patent upon paying \$10 per acre." Here Judge Lindley and myself clashed again, and maybe the Judge was in the right, but I won the point. He advised leasing the land; but it did not seem to me exactly fair to place the oil operator at a disadvantage in comparison with the agricultural operator or the miner. Why not give him a patent?

4. "The fact should be recognized that, in order to stimulate prospecting in wildcat territory, an area larger than 160 acres may be located and held by the drilling of one well; the size of this tract should be left to the discretion of the Department, but it might comprise one or two thousand acres or more."

For example, in Utah there is an outcrop along a bluff for eight or ten miles, which has every indication of being a possible oil field. Up to date, no one has drilled on that ground, because no one could get more than 160 acres without drilling on each additional 160 acres; no man wanted to or could afford to undertake that, because if he went ahead and proved the field, anyone else could come in and take up 160 acres and reap all the benefit. In such conditions, which exist in a good many places in the United States, I believe the first man should have a preference right to an area large enough to justify his operations. I do not see any other way to accomplish the development of that kind of territory unless the Government does it itself. My suggestion

is that lands now withdrawn from entry shall be thrown open from time to time as, in the opinion of the Secretary, they are required for actual development; that a man may then make a location and work it until he makes a discovery, when he can get a patent for the land at \$10 an acre.

The suggestion has been made that the right to locate upon any area of land that the Department sees fit to throw open, should be by lot, in the same way that they draw for locations in Indian reservations that are thrown open. I do not know how it can be done otherwise, because if a tract of 5000 acres is to be thrown open, it is not enough to go around.

Mr. Lawson.—Why not dispose of it by auction?

Mr. Requa.—That immediately puts the tract into the hands of the Standard Oil Co.

Mr. Bain.—That might happen anyway, as the locators merely sell out at an advanced price.

Mr. Lawson.—Why should not the Government get that advance rather than a particular individual?

Mr. Requa.—There are two ways of avoiding this difficulty. First, let the drilling clause be waived upon the payment of \$1 per acre per year, this rate being doubled each year after the first. Second, arrange that no patent be issued at any time, but that a royalty, not exceeding one-tenth be collected, under a lease leaving the Government to supervise the care of the territory; that no transfer be valid except by approval of the Secretary of the Interior; that failure to produce for a period of two years subjects the lease to cancellation; that a bond be filed by the party taking the lease, assuring his financial ability to carry out the obligations in connection with the work; that location for the purpose of speculation be discouraged as far as possible.

In any event, in any transfer from the Government a clause should be inserted to the effect that all drilling should commence in the center of a tract and that the line wells be the last ones to be drilled. I think that will go a long way towards preventing unnecessary and undesirable drilling. Of course, if the line has already been drilled, I see no objection to drilling against it; I am speaking of tracts in which the line has not been drilled. Further than that, it is much more economical to produce oil in the smallest area possible.

Here is another suggestion: "If any reserved oil land be in demand for agricultural purposes prior to its disposition as oil land, the Secretary of Interior may at his option permit the sale of the surface alone to agricultural claimants, reserving to the United States and its assigns the mineral rights, and the right

to prospect for and produce oil, gas or asphalt, subject only to reasonable compensation for actual damage to the surface. In case no agricultural claim has been filed upon the land prior to its opening as oil land, the surface rights, together with the mineral rights, shall then go to the oil claimant."

I do not favor that suggestion. A deed ought to cover either one thing or the other; if a man gets land for agricultural purposes he ought to be entitled to everything on it, and if he gets it for oil land he should be entitled to it all. I know that in many cases in Los Angeles and the Kern River districts it is not feasible to operate as oil properties underneath and agricultural land on the surface, because of the network of pipe lines, and the damage done to crops by disposing of oil-well refuse in the ordinary manner.

A suggestion has been made that, following location, a period of not more than two years be allowed within which to make a bona fide discovery, failing in which the locator must either surrender the land or pay \$1 per acre per year. That is a modification of the previous suggestion. It has also been suggested that land be leased by the Government, subject to a royalty not exceeding one-tenth the value of the product at the well. That the lease should demand reasonable diligence and care in production, and no transfer should be valid except as approved by the Secretary of the Interior. Considerable criticism has been expressed about the stipulation that failure to produce for two years shall render a lease subject to cancellation. I think if the locator pays a fee from year to year, failure to produce ought not to subject the lease to cancellation. The net revenue derived from leasing oil land should go in large part to the state within which the lands are situated. If the lands are patented, the state should have a right to levy a special tax upon the oil, to take care of the police situation.

This covers the suggestions that have been made, and my advice, Mr. Chairman, would be that they be taken up in rotation and discussed in order. The first two I do not think admit of debate: That there are no laws at the present time covering the situation, and that a new law, properly covering the requirements, should be enacted.

The Chairman.—Gentlemen, you have heard the report. What is your pleasure in the matter?

Mr. Lawson.—I move the suggestions be taken up seriatim. (The motion was formally seconded, presented and carried.)

Mr. Requa.—The first one is: "Location of oil-bearing territory should be permitted from time to time as exigencies in the

market may demand, in the opinion of the Department of the Interior." As against that you have the proposal that the land be thrown open regardless.

Mr. Prichard.—I make a motion that the first form be approved.

Mr. Lawson.—The success of the plan will depend upon the advisers of the Secretary. They may know the situation, for instance, in Oklahoma, and not know the situation here.

Mr. Requa.—The only way would be to fix an arbitrary price, and when oil goes above that price to throw open some land. Of course, it will then take a year to bring in the production, so that the price may go clear out of sight before that time comes, unless the situation is anticipated. All this land is withdrawn now, and unless some safeguard is put around it, when it is opened it will all go at once.

The Chairman.—Ought not something to be inserted as to what should be the criterion upon which the Secretary shall decide? As I understand it, your purpose is really to conserve the oil for the future; that, however, is left entirely at the option of the Secretary, and there is nothing to guide him.

Mr. Cottrell.—Would it not be safer to leave that question to be worked out by the Department than to attempt to fix it in the set rules that we are getting up here, which we must compose in a rather hurried form. Those who are charged with the administration will have more time and a better opportunity to reach all concerned.

The Chairman.—We intend to take enough time to consider this matter very carefully before we propose legislation. The principle upon which the Secretary of the Interior is to act ought to be clearly stated in the law, it seems to me, so as to unify the actions of successive Secretaries of the Interior.

Mr. Requa.—Well, the criticism of this procedure is that it attempts by government regulation to control the price of the product in a very direct manner; the people who use oil would immediately enter an objection, and maintain that the market ought to be left open.

Mr. Burch.—It seems to me that a better principle would be to throw all the land open, under some plan by which it could not be acquired quite so easily as it has in the past, and let the natural law of supply and demand regulate its development. Suppose that when petroleum was first discovered in this coun-

try, and was used practically for only one purpose—illuminating oil—this system had been put in force, that the Government had decreed that \$5 a barrel was a fair price, and that whenever it went below that price no more land would be sold; the result would have been that a thousand years would have elapsed before the oil would be worked out, and no more would have been discovered at all. It is over-production that furnishes incentive for the finding of new uses and markets for oil.

Mr. Bain.—The cost of transporting oil forms a large part of the selling price. The Secretary of the Interior might hold that a high price in Pennsylvania was just as necessary as a low price in California. The Standard Oil Co. in Pennsylvania held the price up to about \$1.75 and \$2 a barrel at the same time that Oklahoma oil went down to 40c. a barrel.

Mr. Requa.—There is another point to bring out here. Great Britain at the present time is mining about 250,000,000 tons of coal a year and has an estimated supply for about 450 years. On that basis, California would have to be yielding 800,000,000 bbl. of oil a year; the estimated oil in California is sufficient to supply that demand for only 10 or 15 years, and the Survey has credited California with from one-half to one-third of all the available oil in the United States. If that is true, there is not enough oil to supply the fuel demand, and its conservation is a very urgent subject. Certainly, compared to coal, the quantity of oil is negligible.

The Chairman.—When the Government interferes with prices it is a serious matter, yet it sometimes seems necessary. The government has been forced to do this in order to prevent annihilation of proper competition. On the other hand, there may be such a thing as a competition that will cause the waste of our resources. Between those two extremes might be a legitimate field for the government to act; its action might consist in opening land in such a way as to limit the price of oil to yield a reasonable profit, up to 10 per cent., say, which will induce capital to develop the land. It seems to me that we might offer some suggestions along that line, so that the Secretary of the Interior may have some principle to follow, which will always apply, no matter what the local conditions.

Mr. Requa.—I do not think you can fix any basis of return on investments, because no two pieces of oil land are alike. One territory may average a thousand feet, while another averages 2500 ft.; you may bring in a gusher that will go anywhere from one to five thousand barrels.

The Chairman.—As I understand your point, you desire to conserve the oil for the future as far as possible, and at the same time not to allow prices to be either too low or too high. Why could not such a principle be stated, leaving a large amount of latitude to the Secretary. If the Secretary is not limited, I believe he will possess an arbitrary power which he might use to the damage of the community.

Mr. Prichard.—Does not over-production itself tend to dampen drilling activity?

Mr. Requa.—To a certain extent. However, if one man is drilling his land, the next man feels that he has to drill up against the first or lose some of his oil.

Mr. Merrill.—I make the motion, that it is the sense of this meeting that the Secretary of the Interior shall have absolute discretion to permit location on oil-bearing territory, from time to time, as exigencies in the market may demand, in the opinion of the Department of the Interior, provided, however, that the Secretary shall, as far as possible, safeguard the interests of both consumer and producer, by not allowing the price of oil to rise too high nor fall too low.

(The motion was formally carried.)

Mr. Requa.—We can now take up the next question: "Permission to locate improved territory should be made by lot, as is now permitted in opening Indian reservations, and locations should be made in units of 160 acres." What system do you propose for gaining possession of such land when it is thrown open by the Department?

The Chairman.—Mr. Lawson's suggestion was to sell it to the highest bidder. Every man in the United States would then get some profit out of it. Furthermore, the highest bidder will usually be a company which has the necessary plant to develop the land.

Mr. Prichard.—Distribution by lot has worked very satisfactorily in reservations that have been thrown open for settlement, and the same system would probably apply in the case of minerals.

The Chairman.—There is this difference: If a man makes a discovery of mineral in a new territory, he is a public benefactor; but in this case the government has already staked out the land and the prospector who draws it by lot contributes nothing to its value. Another suggestion I wish to make is, that if land is to be sold at auction, the money received from its sale ought

to be spent in the district in which the land lies; that is, that it should not go to the whole United States, but be spent on improvements in the district.

Mr. Requa.—That is not always feasible; in some of the oil-producing territory of California there is nothing to improve; the land is good for nothing save as oil land.

Mr. Bain.—I move that it is the sense of this meeting that the land should be sold by auction.

(The motion, duly seconded, was formally carried, Mr. Requa voting no.)

Mr. Requa.—The next proposal is a method whereby the locator shall initiate his right. "A proposed locator of lands supposed to contain oil should initiate his right by application to the commissioner of the land office, specifying the tract by Government subdivision, if lands are surveyed. If not surveyed, they must be staked in rectangular shape conforming to the system of public land surveys, and described by metes and bounds. This application should be filed with the registrar of the land office, and notice of the filing should be recorded in the county recorder's office. The registrar shall note the application on his tract books and until the commissioner acts upon the application the land shall be withdrawn from all other kinds of entry and location. Upon favorable action by the commissioner, the locator must, within a specified time, commence drilling and thereafter prosecute continuously the drilling of the well."

Mr. Lawson.—I move an amendment, that all tracts that are offered for open entry be first surveyed by a United States mineral surveyor or a sectionizing surveyor, acting under the Department of the Interior.

(The motion was formally presented and carried.)

Mr. Requa.—Upon the discovery of oil in commercial quantities, a locator gains possessory right, and no one can disturb him, but he must make his discovery. Now, what happens? "Upon the discovery of oil in commercial quantities he shall be entitled to a patent upon paying \$10 per acre."

Mr. Burch.—As I understand, he bids for a certain tract offered for sale.

The Chairman.—My understanding was that he is to buy at auction, and then to pay a certain price for first choice; that is, he bids for first choice, instead of having it given to him by lot.

Mr. Requa.—That is my understanding, that the locator bids for a right to go in and prospect a particular area. When his prospecting is successful and he has discovered oil, does he not get any better title to the land?

Mr. Beals.—Why could not the Government auction the land in 160-acre tracts, and put up each particular piece of land at auction?

Mr. Burch.—The tract is surveyed, and notice is given some months in advance that it is going to be sold at auction. This gives every man an opportunity to go over the land and select the particular tract he wants to bid on; and when it is put up he bids on that particular quarter section.

Mr. Lawson.—As a substitute to the amendment, I move that territory be offered for sale at auction in specific tracts of 160 acres, and that bidding be confined to each particular tract.

The Chairman.—Mr. Requa's question is still unanswered: does this give a man a deed to the land? If so, a minimum price must be fixed, say, \$10 an acre.

Mr. Bain.—He is only buying a right to prospect.

Mr. Requa.—When he discovers oil, I think he ought to be permitted to buy the land from the Government for \$10 an acre.

Mr. Bain.—This involves a broad question of public policy. You all recognize the fact that any legislation concerning oil land must take into account conditions not here alone, but throughout the United States. Apparently the administration has made up its mind to favor the leasing system, not so much for the royalty, as to make possible a control of monopoly.

Mr. Lawson.—Not only that, but also to prevent large concerns, which might desire to limit the output of oil, from acquiring possession of a territory, or a large fraction of it, without developing it at all.

The Chairman.—I think, gentlemen, on this question all who do not own oil land, and have no intention to own them, will agree that it is better for the Government to lease lands rather than sell them; on the other hand, those who do own land would rather own it in fee simple.

Mr. Bain.—I move that it is the sense of this meeting that leasing rather than patenting should prevail. I wish to have it clearly understood that the royalty itself is the least consideration; it should be very small, and should not be a burden.

(The motion was formally carried.)

Mr. Requa.—If the land is going to be leased, it ought not to be put up at auction, but disposed of by lot, and the one who gets it pays the royalty.

Mr. Bain.—The bidding in this case would not be so much per hundred acres for a pre-emption, but on the basis of the percentage you are willing to pay; then no one pays anything unless he gets something.

Mr. Merrill.—I voted in favor of disposing of land by auction. I now move a reconsideration. I think Mr. Requa's point is very well taken. Our discussion was all based on the premise that the land was to be sold. Now we have changed our opinion on that and we must modify this to make it consistent.

(The motion, duly seconded, was carried.)

Mr. Bain.—I move that it is the sense of this meeting that ground be opened by auction, in specific grants, the consideration to be a royalty, that is, a percentage of the oil produced.

Mr. Cottrell.—Would it not be advisable to require deposit of some bond before commencing to drill? Otherwise a whole territory might be tied up with wild-cat bids.

Mr. Bain.—In Indian Territory they require bonds, but the practice does not work out. They require a man to have \$10,000 in bank on which to draw.

The Chairman.—It is difficult to formulate this matter in a large meeting like this. Would it not be better for us to agree upon certain principles. Let us take one principle and pass on that. It is moved and seconded that each individual parcel shall be auctioned to the highest bidder, the bidding to be in terms of percentage of yield of oil, payable to the Government as a royalty.

(The motion was formally carried.)

The Chairman.—Now the question comes up about the bond.

Mr. Requa.—I move that no bids shall be received unless accompanied by bond in the sum of \$10,000, satisfactory to the Secretary of the Interior.

(The motion was formally carried.)

Mr. Cottrell.—Suppose an operator begins to drill and proves the territory barren; what becomes of his bond? When he abandons his lease, does he get his bond back?

Mr. Requa.—If he puts up a rig and commences drilling, he has secured his bond; it is terminable. Paragraph B provides

only that he must enter within a specified time and drill continuously. Sixty days has been suggested as a proper length of time. Do you wish to substitute for that a time to be specified by somebody?

The Chairman.—It has been moved that a locator, after filing his bond, shall enter upon the property and begin drilling within a time to be specified by the Department of the Interior, for each district.

(The motion, duly seconded, was formally carried.)

Mr. Cottrell.—If a bond of \$10,000 is required, and the operator, after spending \$5,000, abandons his lease in some way, should he forfeit his whole \$10,000, or only the other \$5,000. It seems to me that the better way is to require a bond that is reasonable, for the amount that should be expended; after the operator puts that amount into the ground, his obligation should be released to that extent.

Mr. Bain.—I move that when money is expended upon a lease, it should be applied to the extinguishment of the bond, and when the amount so expended equals the face of the bond, the bond itself should be released.

(The motion was seconded and formally carried.)

Mr. Requa.—Now, about going into wild-cat territory and prospecting—"The fact should be recognized that, in order to stimulate prospecting in wild-cat territory, an area larger than 160 acres may be located and held by the drilling of one well; the size of this tract should be left to the discretion of the Department, but it might comprise one or two thousand acres or more."

Mr. Merrill.—I move that the principle just stated be the sense of the meeting, definitions and phraseology to be determined later.

(The motion was seconded and formally carried.)

Mr. Merrill.—I move that it be the sense of the meeting that the Government should impose restrictions upon transfer of leases, so as to prevent the monopoly of any considerable portion of them.

(The motion was seconded and formally carried.)

Mr. Prichard.—If an operator does not work his land, beyond boring a well, can he hold the land indefinitely?

Mr. Cottrell.—That is provided against by taxation.

Mr. Requa.—The way they do that in the oil business now is this: they give a lease stating that so many wells must be drilled a year, provided that oil is above a certain price; if oil falls below that price drilling may cease. If a man wants to forfeit his lease, he has a right to keep the wells he has drilled, and produce from them so long as he pays the royalty.

Mr. Lawson.—That would not prevent the Standard Oil Co. from acquiring a great many 160-acre tracts, do enough drilling to quash the bond, and then let the ground lie idle.

Mr. Requa.—They will have the right to the wells they have drilled, and the rest reverts to the Government as soon as they stop drilling. A certain number of strings of tools must be kept in continuous operation.

Mr. Bain.—I move that this principle be adopted in our recommendation.

(The motion was seconded and formally carried.)

The Chairman.—Mr. Requa made one other point, about drilling the first well in the middle of your territory. I am not so sure of the universal application of that rule. It depends a good deal upon geological formation. It might put an operator to a great hardship.

Mr. Requa.—The only stipulation was that he must not drill his line wells first, that is, not within 300 ft.

Mr. Lawson.—I move that this provision be referred to a committee for proper formulation.

(The motion was formally presented and carried.)

The Chairman.—Another matter of some importance is before us, namely, the vote on the Raker Bill. Mr. Hanks is with us, and he has some interest in the Raker Bill.

Mr. Hanks.—The Raker Bill provides for free assays; that is its only bad feature. That puts into the hands of the Government something that is now very well done by individuals. I do not think prospecting as a whole suffers from lack of proper assaying and testing, or that the prices at which such assaying is done are too high. It was that particular clause in the Raker Bill that a good many of us objected to. I think we have been able to present the objections in such a way that that project has been eliminated.

The Chairman.—One other feature seems rather vicious; that is, that Congress shall determine where the experiment stations shall be located. It should be left to the Bureau of Mines to locate them to the best interest of the country.

Mr. Hanks.—Already five or six bills have been introduced, all worded in exactly the same way, in behalf of different states. Once the committee decides upon the general form of those stations, I imagine the selection of their location will be referred to the Bureau of Mines. I do not think that either House of Congress as a whole can agree on any other plan.

Mr. Bain.—I move that the San Francisco section is opposed to the establishment of independent stations in the individual states as designated by Congress, and favors instead the appropriation directly to the Bureau of Mines of sufficient funds for the work, the number and the locations of the experiment stations to be determined from time to time by the Director of the Bureau of Mines, as the public interest may demand.

(The motion was formally carried.)

Mr. Read.—I move that the secretary be authorized to convey to the representatives in Congress, and to make public in other ways, the sense of this meeting.

Mr. Bain.—Before we adjourn I will call attention to the fact that according to our schedule this is the last meeting of the year. If there is no motion to the contrary our next meeting will be on the first Monday in September.

The Chairman.—Would it not be a good plan to make mimeographed copies of the committee's report on "Proposed Oil Land Legislation," as revised to include the suggestions made at this meeting? This revised copy should be sent to all members of this section for their approval. It seems to me that we should not go on record in anything that is to go to Congress until we are all of one mind on the matter. We might then hold a special meeting at the call of the chair.

On motion, duly seconded, it was voted that Mr. Requa mimeograph his report and send it to all members of the section; also that the meeting adjourn subject to the call of the chair. The meeting then adjourned.

H. FOSTER BAIN,
Secretary of Section.

PERSONALS

Ralph Arnold was recently in San Francisco and will soon leave for Venezuela.

J. M. Boutwell is making a study of the country surrounding Courtland, Ariz.

Albert Burch was recently in Nevada on professional work.

G. Caetani has returned from a professional visit in Colorado, where he remodeled the mill at the Smuggler mine, in Marshall basin, near Telluride. He is remodeling the Tomboy mill in the same camp.

J. Parke Channing, who recently made a trip to the Miami district, addressed a meeting of mining men at Miami which was called for the purpose of organizing a mining institute. Mr. Channing also made an address at Houghton, Mich., June 5, before the Copper Country Club.

J. Morgan Clements has gone to northern British Columbia.

Fred Hellmann has been on a professional trip to Los Angeles

J. R. Finlay has been in British Columbia on professional business.

William Kelly, one of the trustees of the Michigan College of Mines, delivered an address, on April 19, to the 1912 class of that institution.

Waldemar Lingren has been appointed professor and head of the department of geology at the Massachusetts Institute of Technology, succeeding Dr. T. A. Jaggar, who is to be Director of the Hawaiian Volcano Observatory.

Charles H. Munro was in Skagway, Alaska, recently, and went on to the Whitehorse district, Yukon Territory.

F. L. Ransome's report on the Turquoise copper mining district of Arizona has just been issued by the U. S. Geological Survey.

T. T. Read has been visiting the Mother Lode mines of California.

J. J. Rutledge has been spending a few days in Alabama, inspecting the mines and devoting considerable attention to investigating the working of gasoline locomotives, a number of which have recently been installed in Alabama.

Walter Harvey Weed is now consulting engineer for the Callahan mine in addition to being appointed in the same capacity for the Interstate Silver Lead Mining Co.; both mines are in the Coeur d'Alene district, Idaho.

Horace V. Winchell, mining engineer of Minneapolis, was recently in National, Nev., making an examination of the properties under litigation between the National Mines Co. and the Charleston Hill National Mining Syndicate. Mr. Winchell will leave for Europe, July 23.

MEMBERS ELECTED IN JUNE, 1912

- Magnus, Benjamin.....Port Kembla, N. S. W.
Gen. Mgr., Electrolytic Refining & Smelting Co., of
Australia, Ltd.
- Weeks, Francis D.....52 Broadway, New York
Metallurgical Engineer, American Metal Co.
- White, Rush J.....Wallace, Ida.
Supt. of Mines and Chief Engr., Federal Mining
& Smelting Co.

COMMITTEES.

Executive Committee.

H. M. CHANCE
J. PARKE CHANNING
J. R. FINLAY
W. R. INGALLS
H. S. MUNROE

Annual Medal.

H. S. MUNROE, *Chairman*
JAMES F. KEMP
ARTHUR L. WALKER

Mining Law.

H. V. WINCHELL, *Chairman*
C. W. GOODALE
M. L. REQUA

Panama-Pacific Engineering Congress.

E. H. BENJAMIN
F. W. BRADLEY
C. W. MERRILL

Professional Ethics.

B. B. LAWRENCE, *Chairman*
F. LYNWOOD GARRISON
S. W. MUDD

Professional Training.

A. L. WALKER, *Chairman*
S. B. CHRISTY
F. W. BRADLEY

Standardization.

C. R. CORNING, *Chairman*
ROBERT PEELE
HENNEN JENNINGS

Mining and Metallurgical Society *of America*



Bulletin Number Fifty
July 31, 1912
Vol. V, No. vii

Published at the Office of the Secretary
505 Pearl St., New York.

OFFICERS FOR 1912.

President, J. PARKE CHANNING, 42 Broadway, New York.

Vice-President, J. R. FINLAY, 52 William St., New York.

Secretary, { W. R. INGALLS, 505 Pearl St., New York.
Treasurer, }

Executive Committee: Messrs. H. M. Chance, J. Parke Channing, J. R. Finlay, W. R. Ingalls and H. S. Munroe.

COUNCIL.

At large, ex-officio.

J. Parke Channing, 42 Broadway, New York.....Retires January, 1913

J. R. Finlay, 52 William St., New York.....Retires January, 1913

W. R. Ingalls, 505 Pearl St., New York.....Retires January, 1913

Districts 1-2-3.—New York and New England.

H. S. Munroe, Columbia University.....Retires January, 1913

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J. F. Kemp, Columbia University.....Retires January, 1915

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S. W. Mudd, Los Angeles.....Retires January, 1913

District 12.—Montana, Idaho, Washington and Canada.

C. W. Goodale, Butte.....Retires January, 1913

OFFICERS OF SECTIONS.

SAN FRANCISCO.

S. B. Christy,
Chairman.

H. F. Bain,
Secretary,

NEW YORK.

Geo. C. Stone,
Chairman.

E. G. Spilsbury,
Vice-Chairman.

Louis D. Huntton,
Secretary.

PHILADELPHIA.

R. H. Sanders,
Chairman.

F. Lynwood Garrison,
Secretary.

Mining and Metallurgical Society of America

Vol. V

July 31, 1912.

No. 7

ANNOUNCEMENTS.

Badge.—The badge of the Society, officially adopted by the council, may be obtained from the Secretary at a cost of \$5 when made in gold, silver and blue enamel; \$20 when made in gold, platinum and blue enamel. The badge may be obtained either as a pin or as a watch-charm. In ordering, be particular to state which form is wanted.

Bound Volumes.—Bound volumes of the Bulletin of the Society for 1911 may be obtained from the Secretary for the price of \$1.50. Any member desiring a complete set of the bulletins for 1911 unbound can obtain it, free of charge, by application to the Secretary.

Changes in Address.—Members are requested to notify the Secretary promptly of changes in address.

New York Section.—The next meeting of the New York section will be on Tuesday, Sept. 17, at the Engineers' Club, New York, at 8.30 p.m., preceded by a dinner (informal) at 6.30 p.m.

Ballot.—According to the provisions of the resolution under which the Society voted to award an annual medal, the rules for such an award must be approved by the membership of the Society. The committee on medal having formulated rules which were printed in Bulletin No. 48, and the report of the committee, with amendments, having been approved by the Council of the Society, as published in Bulletin No. 50, by order of the president, the rules so amended and approved are to be submitted to ballot of the membership on Aug. 1, 1912. The polls will be open for thirty days, and other conditions will be as provided in the by-laws.

W. R. INGALLS,
Secretary.

COUNCIL

A meeting of the council, of which notice was given to all members on June 25, was held at the Engineers' Club, New York, on July 8, at 5 p.m. The members present were Messrs. Channing, Finlay, Ingalls and Munroe. Dr. Chance was represented by Mr. Ingalls by proxy. The members present in person and by proxy constituted a quorum.

The minutes of the meetings of council on March 14 and May 16, having been sent to all members of the council, were approved as thus submitted.

Upon motion, duly seconded, and unanimously carried, the Treasurer of the Society was authorized to accept the lists of members contributing to the expense of carrying on local sections, as communicated by the secretaries of the respective local sections, as the formal record of membership in such sections.

The report of the medal committee, published in Bulletin No. 48, May 31, 1912, pp. 110-112, was discussed. The report was considered satisfactory except that possible chance of failure to reach a conclusion as to the award of the medal was anticipated. In order to eliminate this contingency rules four and five were amended as follows:

4. Four months before the award of the medal, the council shall determine the specific object for which the medal is to be awarded. All nominations of candidates whose claims to recognition lie in that special field of work shall then be considered by a committee of three to be appointed by the President. At least two months before the award this committee shall submit a list of two names to the council with full statement of the claims of each candidate. The committee may consider and recommend names not nominated by members of the Society. The names so recommended shall be submitted to the council for election by letter ballot.

5. For the election of a candidate a majority vote of the council shall be necessary. If this majority be not obtained on the first election other ballots may be taken either by letter or at a meeting of the council called for the purpose. At such meeting members of the council may be represented in proxy.

With the above amendments to rules 4 and 5, upon motion, duly seconded, the report of the committee was unanimously adopted.

The President of the Society reported that the chairman of the committee on mining law had stated that he expected to submit a report next fall.

There being no further business, the meeting was then adjourned.

W. R. INGALLS,
Secretary.

REPORT OF COMMITTEE ON MEDAL

April 10, 1912.

Mr. J. Parke Channing,
President, Mining and Metallurgical Society of America.

Dear Sir: The undersigned were appointed a committee to frame regulations for the award of a gold medal by this Society, and beg to submit the following report:

Your committee has made careful study of the rules and practice governing the award of similar medals by other societies and has endeavored to make use of these precedents as a guide in framing regulations for our own Society.

The Constitution of our Society outlines five objects, namely, the conservation of mineral resources, the advancement of mining and metallurgical industries, the better protection of mine investors and mine workers, the increase of scientific knowledge, and the encouragement of high professional ideals and ethics. The membership of the Society includes mining and metallurgical engineers and geologists and under each of these heads our members cover many special fields of work. It is evident at the outset that it would be difficult, if not impossible, to decide between the merits of the gentlemen who may have fairly earned recognition by this Society with so many objects and so many different lines of work to be considered.

In view of the above your committee recommends that the medal be awarded each year for different kinds of service to the profession and to the community and as a basis for such award suggests the following tentative list:

1. For services contributing to better protection of mine workers.
2. For work tending to safeguard the interests of mine investors.
3. For distinguished work in the field of economic geology.
4. For notable contributions to the science of coal mining.
5. For notable contributions to the science of metal mining.
6. For notable contributions to the science of ferrous metallurgy.
7. For notable contributions to the science of non-ferrous metallurgy.

It is recommended by the committee that each year the Council shall invite the members of the Society to suggest the specific object for which the medal shall be awarded and shall ask them to nominate persons who may be entitled to recognition. The nominations should not be confined to members of the Society and should include other nationalities than our own. Nominations by members should be accompanied by detailed statements of the claims of the candidates for consideration. On receipt of these recommendations the Council shall determine the specific object for which the medal shall be awarded. A committee should then be appointed by the President to consider all nominations. The committee should make a detailed report and submit a list of not less than three names to the Council for election by letter ballot. For election a candidate should receive not less than four-fifths of the vote of the Council, several ballots being taken for the purpose if necessary. In order to carry these suggestions into effect the committee begs to submit the following rules:

1. A gold medal shall be awarded by this Society each year for conspicuous professional or public service for the advancement of the science of Mining, of Metallurgy, or of Economic Geology; for the betterment of the conditions under which these industries are carried on, for the protection of mine investors, and especially for the better protection of the health and safety of workmen in mines and metallurgical establishments.

2. This medal shall be awarded at the annual meeting of the Society in January.

3. Six months before the award the Secretary shall send a circular letter to all members requesting suggestions as to the specific object for which the medal shall be awarded and asking for the nomination of candidates on a form provided for the purpose, such nominations to be accompanied by a full statement of the claims of the candidates for consideration. These nominations shall not be confined to members of the Society and may include other nationalities than our own.

4. Four months before the award of the medal the Council shall determine the specific object for which the medal is to be awarded. All nominations of candidates whose claims to recognition lie in that special field of work shall then be considered by a committee of three to be appointed by the President. At least two months before the award this committee shall submit a list of two names to the Council with full statement of the claims of each candidate. The committee may consider and recommend names not nominated by members of the Society.

The names so recommended shall be submitted to the Council for election by letter ballot.

5. For the election of a candidate a majority vote of the Council shall be necessary. If this majority be not obtained on the first election other ballots may be taken either by letter or at a meeting of the Council called for the purpose. At such meeting members of the Council may be represented in proxy.

Respectfully submitted,

HENRY S. MUNROE, *Chairman*,
ARTHUR L. WALKER,
J. F. KEMP.

PERSONALS

H. C. Bellinger is making a trip which will include London, New York, Salt Lake City and Vancouver.

J. M. Boutwell has completed an investigation in the Courtland camp, Arizona.

F. W. Bradley has gone to Alaska, expecting to return early in September.

J. C. Bränner has gone to the Hetch-Hetchy valley on professional work.

Corey C. Brayton has resigned as manager for the rock-crushing department of the Natomas Consolidated, and will engage in gold dredging on the Seward peninsula, Alaska, with headquarters at Solomon.

R. Gilman Brown went to Russia, intending to be away from London until the middle of July.

Charles Butters has been in Cobalt, Ont., inspecting the new mill at the Nipissing, and the cyanide process being installed there.

Eli T. Conner has been on a professional trip to Newfoundland.

Howard W. Dubois has gone to the Quesnelle placers, in the Cariboo district.

Edward L. Dufourcq sailed from New York July 2, on a business trip to England and France. He expects to return about the middle of August.

MINING AND METALLURGICAL SOCIETY OF AMERICA

F. L. Garrison recently visited the Comstock and was in San Francisco the middle of July.

B. B. Gottsberger is president of the Miami Engineering Society, which has recently been formed, and consists of the members of the technical staff of the Miami Copper Co.

Edwin C. Holden was at Nelson, B. C., early in July.

J. P. Hutchins has been in the Nerchinsk district, examining alluvial ground for the Russian Government.

J. F. Kemp has been elected a member of the American Philosophical Society.

J. Volney Lewis intends to spend the greater part of the summer in the study of mining regions in the West. For the present he is busy with the publication of his new "Determinative Mineralogy," which is to appear in August.

J. W. Malcolmson has returned to Kansas City from Sonora.

W. W. Mein has become the general manager and chief consulting engineer of the Canadian Exploration & Mining Co., and will make his headquarters in New York.

C. W. Merrill has been chosen first president of the Engineers' Club, recently formed in San Francisco. The members will meet at luncheon at the Palace Hotel on Tuesdays. H. Foster Bain is a member of the executive committee.

W. A. Prichard has been investigating mining conditions on the Mother Lode.

Robert H. Richards was married June 8 to Lillian Jameson, at Jamaica Plain, Massachusetts.

Franklin W. Smith has returned to Parral from the United States.

Walter Harvey Weed has been at Bisbee, Ariz., making geological investigations.

CHANGES IN ADDRESS

Brayton, Corey C.....Room 408, 311 California St.,
San Francisco, Cal.

Mein, W. W.....43 Exchange Pl., New York.

Mining and Metallurgical Society *of America*



Bulletin Number Fifty-one
August 31, 1912
Vol. V, No. viii

Published at the Office of the Secretary
505 Pearl St., New York.

OFFICERS FOR 1912.

President, J. PARKE CHANNING, 42 Broadway, New York.

Vice-President, J. R. FINLAY, 52 William St., New York.

Secretary, { W. R. INGALLS, 505 Pearl St., New York.
Treasurer, }

Executive Committee: Messrs. H. M. Chance, J. Parke Channing, J. R. Finlay, W. R. Ingalls and H. S. Munroe.

COUNCIL.

At large, *ex-officio*.

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C. W. Goodale, Butte.....Retires January, 1913

OFFICERS OF SECTIONS.

SAN FRANCISCO.

S. B. Christy,
Chairman.
H. F. Bain,
Secretary.

NEW YORK.

Geo. C. Stone,
Chairman.
E. G. Spilsbury,
Vice-Chairman.
Louis D. Huntoon,
Secretary.

PHILADELPHIA.

R. H. Sanders,
Chairman.
F. Lynwood Garrison,
Secretary.

Mining and Metallurgical Society of America

Vol. V

August 31, 1912.

No. 8

ANNOUNCEMENTS.

Badge.—The badge of the Society, officially adopted by the council, may be obtained from the Secretary at a cost of \$5 when made in gold, silver and blue enamel; \$20 when made in gold, platinum and blue enamel. The badge may be obtained either as a pin or as a watch-charm. In ordering, be particular to state which form is wanted.

Bound Volumes.—Bound volumes of the Bulletin of the Society for 1911 may be obtained from the Secretary for the price of \$1.50. Any member desiring a complete set of the bulletins for 1911 unbound can obtain it, free of charge, by application to the Secretary.

Changes in Address.—Members are requested to notify the Secretary promptly of changes in address.

New York Section.—The next meeting of the New York section will be on Tuesday, Sept. 17, at the Engineers' Club, New York, at 8.30 p.m., preceded by a dinner (informal) at 6.30 p.m.

Ballot.—For the canvass of the ballot upon adoption of rules for the award of the annual medal of the Society, for which the polls closed on August 31, the President of the Society appointed L. D. Huntoon and F. W. Parsons as tellers. The tellers reported as follows:

J. R. FINLAY, *Vice-President.*

Dear Sir:

We met at the office of the Secretary on September 3 and received from the Secretary the ballots duly sorted and compared

with the list of members as provided in the by-laws. We found that 93 votes had been cast, of which 81 were in the affirmative, 11 in the negative and 1 was blank.

L. D. HUNTOON,
F. W. PARSONS,
Tellers.

The members of the Society having been requested under date of August 1, 1912, to vote upon the adoption of rules to cover the award of the annual medal of the Society, as drafted by the committee on annual medal and adopted, with amendments, by the council of the Society on July 8, which rules, as amended and adopted, were printed in bulletin No. 50, dated July 31, 1912; and a majority of votes cast on the ballot of August 1, 1912, canvassed on August 31, having been in the affirmative, as reported by the duly appointed tellers, I hereby declare said rules to have been formally adopted by the Society.

J. R. FINLAY,
Vice-President.

In the absence of the President of the Society, the Vice-President has acted in his place. The rules formally adopted by the Society are as follows:

1. A gold medal shall be awarded by this Society each year for conspicuous professional or public service for the advancement of the science of mining, of metallurgy, or of economic geology; for the betterment of the conditions under which these industries are carried on, for the protection of mine investors, and especially for the better protection of the health and safety of workmen in mines and metallurgical establishments.

2. This medal shall be awarded at the annual meeting of the Society in January.

3. Six months before the award the Secretary shall send a circular letter to all members requesting suggestions as to the specific object for which the medal shall be awarded and asking for the nomination of candidates on a form provided for the purpose, such nominations to be accompanied by a full statement of the claims of the candidates for consideration. These nomina-

tions shall not be confined to members of the Society and may include other nationalities than our own.

4. Four months before the award of the medal the Council shall determine the specific object for which the medal is to be awarded. All nominations of candidates whose claims to recognition lie in that special field of work shall then be considered by a committee of three to be appointed by the President. At least two months before the award this committee shall submit a list of two names to the Council with full statement of the claims of each candidate. The committee may consider and recommend names not nominated by members of the Society. The names so recommended shall be submitted to the Council for election by letter ballot.

5. For the election of a candidate a majority vote of the Council shall be necessary. If this majority be not obtained on the first election other ballots may be taken either by letter or at a meeting of the Council called for the purpose. At such meeting members of the Council may be represented in proxy.

W. R. INGALLS,
Secretary.

SAN FRANCISCO

The following communication was made to the members of the San Francisco Section:

"At the meeting of the San Francisco section of the Mining and Metallurgical Society held May 6, Mr. M. L. Requa, as chairman of the special committee upon oil land legislation presented a report which after extensive discussion led to the passage of the enclosed resolutions. It was thought desirable to have these, after formulation, sent to each member of the section for comment before final action was taken, and Mr. Requa has asked me to phrase and forward the resolutions. The report of the discussion is printed in Bulletin 49 of the Society. Your written comment is desired for presentation to the section.

H. FOSTER BAIN,
Secretary of Section.

The resolutions referred to are as follows:

1. There being no laws at present under which oil land can be acquired satisfactorily, a special Federal law should be enacted governing the acquirement of oil, gas and asphalt lands, and all lands known or reasonably supposed to contain oil, gas or asphalt should only be disposed of under the terms of the new law.

2. From time to time as the desirability of maintaining a stable price for oil may in the opinion of the Secretary of Interior demand, oil, gas, and asphalt lands now reserved or hereafter withdrawn shall be thrown open to entry in blocks of such size as he shall determine. In fixing the size and position of the blocks, he shall recognize the principle that the pioneer may properly be given a larger area than the one who follows.

3. Prior to the opening of any lands to entry, they shall be properly surveyed and suitably monumented, and they shall be divided into tracts of 160 acres.

4. Leases upon the individual tracks shall be allotted by the Secretary upon the basis of competitive bids; the latter to be in terms of royalty offered, all royalties to be payable in parts of the product.

5. Successful entrymen shall file with the Secretary a good and sufficient bond to the amount of \$10,000 for the faithful performance of the terms of the contract.

6. Lessees shall commence drilling within a specified and agreed time and all money expended upon the lease in bona fide effort to develop oil, gas, or asphalt, or to operate oil, gas, or asphalt wells, shall apply to the extinguishment of the bond and when the total amount so expended equals the amount of the bond, the latter shall be cancelled.

7. Transfer of leases shall only be valid upon approval of the Secretary and he may refuse approval whenever in his judgment such transfer would tend to create or to strengthen a monopoly, but he shall not use this power of refusal as a means to exact increased royalty.

8. The lessee shall drill each year an agreed number of wells or shall keep in operation an agreed number of strings of tools unless the local price of oil falls below a certain agreed

price. If the lessee forfeits a lease, he shall retain his rights in all wells already drilled and may continue to produce from them so long as he pays the agreed royalty.

9. Line wells must be drilled last except where it is necessary to protect the lease.

10. Net revenue from leasing the oil lands should go in large part to the State within which the lands are situated.

PERSONALS

J. M. Boutwell's report on Park City, Utah, was recently published by the United States Geological Survey. Mr. Boutwell is now engaged in geological study at Morenci, Ariz.

Charles Butters has been visiting the Nipissing high-grade plant at Cobalt, Ontario.

J. Parke Channing sailed for Europe on August 24, expecting to remain abroad about six weeks.

J. Morgan Clements and Howard W. DuBois have been examining mineral claims in the vicinity of Hazelton, Skeena district, British Columbia.

August Hoffmann has resigned and will soon leave the Syssert Estate for Stockholm.

Thomas H. Leggett has been appointed consulting engineer of the mining department of the American Smelting and Refining Co. His partnership with Fred Hellmann has therefore been dissolved. Mr. Hellmann will remain in the present offices at 60 Broadway, New York, and continue the business in his own name.

Walter Harvey Weed's report on "The Geology and Ore Deposits of the Butte District" has just been issued by the U. S. Geological Survey.

Edward S. Wiard is engaged in preparing the MS. for a complete book on ore dressing. It will thoroughly cover the testing of ores, proper location of the mill, design of mill buildings, flow sheets, and the theoretical and practical care and operation of machinery. Mr. Wiard expects to complete this work within the next two or three months. It will be published by the McGraw-Hill Book Co. of New York.

Alexander N. Winchell has resigned from the United States Geological Survey in order to resume work as a consulting mining geologist. He has recently returned to his office in Madison, Wis., after spending several weeks in Nevada in connection with litigation regarding the ownership of the ore deposits of the National Mine in that State.

CHANGES IN ADDRESS

Clark, C. D..... Care W. Rowland Cox & Staff,
165 Broadway, N. Y.
Leggett, Thos. H.....165 Broadway, New York
Lyon, D. A.....Box 83, Oakland Sta., Pittsburgh, Pa.

MEMBER ELECTED IN AUGUST

Ball, Sydney H.....71 Broadway, New York
Mining Geologist.

Mining and Metallurgical Society *of America*



Bulletin Number Fifty-two
September 30, 1912
Vol. V, No. ix

Published at the Office of the Secretary
505 Pearl St., New York.

OFFICERS FOR 1912.

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Vice-President, J. R. FINLAY, 52 William St., New York.

Secretary, {
Treasurer, { W. R. INGALLS, 505 Pearl St., New York.

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At large, ex-officio.

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OFFICERS OF SECTIONS.

SAN FRANCISCO.

S. B. Christy,
Chairman.
H. F. Bain,
Secretary,

NEW YORK.

Geo. C. Stone,
Chairman.
E. G. Spilsbury,
Vice-Chairman.
Louis D. Huntoon,
Secretary.

PHILADELPHIA.

R. H. Sanders,
Chairman.
F. Lynwood Garrison,
Secretary.

Mining and Metallurgical Society *of America*

Vol. V

September 30, 1912.

No. 9

ANNOUNCEMENTS.

Badge.—The badge of the Society, officially adopted by the council, may be obtained from the Secretary at a cost of \$5 when made in gold, silver and blue enamel; \$20 when made in gold, platinum and blue enamel. The badge may be obtained either as a pin or as a watch-charm. In ordering, be particular to state which form is wanted.

Bound Volumes.—Bound volumes of the Bulletin of the Society for 1911 may be obtained from the Secretary for the price of \$1.50. Any member desiring a complete set of the bulletins for 1911 unbound can obtain it, free of charge, by application to the Secretary.

Changes in Address.—Members are requested to notify the Secretary promptly of changes in address.

MEETINGS OF SECTIONS.

NEW YORK.

The first meeting of the New York section for the year 1912-13 was held after an informal dinner at the Chemists' Club, 52 West 41st Street, on Tuesday, Sept. 17, 1912.

The meeting was called to order by the chairman, Mr. G. C. Stone. Those present were: Messrs. R. M. Catlin, J. R.

MINING AND METALLURGICAL SOCIETY OF AMERICA

Finlay, L. D. Huntoon, W. R. Ingalls, H. H. Knox, T. H. Leggett, W. W. Mein, H. S. Munroe, Robert Peele, E. G. Spilsbury, G. C. Stone, J. A. Van Mater, A. H. Wethey and Mr. Stokes, guest of Mr. Mein.

Minutes of the last meeting were approved as presented in the Bulletin.

Nominations for officers for the coming year being called for, E. G. Spilsbury nominated G. C. Stone for the office of Chairman; the motion was seconded and carried. W. R. Ingalls nominated E. G. Spilsbury for Vice-Chairman; the motion was seconded and carried. W. R. Ingalls nominated L. D. Huntoon for Secretary and Treasurer; the motion was seconded and carried.

The following report of the Treasurer, covering the period from Sept. 1, 1911, to Sept. 1, 1912, was read and accepted:

Receipts.

Balance from 1911.....	\$127.86
Two-third cost of reporting meetings for 1910-1911	26.67
	<hr/>
	\$154.53

Expenditures.

Stenographer for reporting eight meetings..	\$40.00
Postal cards	1.20
Balance on hand Sept. 1, 1912.....	113.33
	<hr/>
	\$154.53

Mr. Peele reported that the Committee on Standardization had been at work for the past six months, and had made some progress; he hopes to be able to present a full report to the Society in the Autumn or early Winter.

The Chairman called on the members to relate any unusual or interesting experiences occurring during the past Summer. Mr. Catlin gave a short talk on his experiences in the West, particularly in California. Mr. Spilsbury spoke of the iron ore deposits in northeastern Texas; he also mentioned certain new sulphur deposits in Texas, and the salt and sulphur deposits of Louisiana.

Mr. Finlay suggested that a geologist be invited to give a lecture at some meeting during the coming Winter, on the changes in climatic conditions of the earth, throughout the successive geological periods.

Mr. Spilsbury* suggested that Prof. Grabau, of Columbia University, be invited to deliver a lecture on the formation of salt deposits in the earth. The suggestion was adopted.

The meeting then adjourned.

LOUIS D. HUNTOON,
Secretary of Section.

SAN FRANCISCO.

The San Francisco section met, after dinner at the Hotel Sutter, on Monday, Sept. 9, at 7 p.m. The following gentlemen were present: S. B. Christy, Chairman; E. A. Hersam, M. L. Requa, R. P. McLaughlin, Charles Janin, Stewart Rawlings, H. W. Turner, A. C. Lawson, Gelasio Caetani, T. T. Read, H. Foster Bain.

The subject of the evening was a further discussion of the report of the Committee on Federal Laws Governing Oil Lands. Letters were read from C. W. Goodale, G. W. Metcalfe, R. S. Rainsford, and M. L. Requa. Messrs. Goodale and Metcalfe gave general approval to the preliminary draft submitted. Mr. Rainsford vigorously dissented, and Mr. Requa filed special objections to section 4, providing that leases be disposed of by auction.

The proposed rules were considered section by section, and were adopted with minor amendments, save No. 4, on which there was a majority in favor of allotment by auction, but a strong minority in favor of disposition by lot. The entire report was then referred to Mr. Requa, as chairman, with instructions to formulate it, including a suitable preamble and majority and minority reports on section 4.

The meeting thereupon adjourned.

H. FOSTER BAIN,
Secretary of Section.

PERSONALS

Alfred H. Brooks has been appointed a member of the Alaskan Railroad Commission, and is now en route to Alaska.

Herbert C. Hoover left New York early in September for California, where he expected to remain for about a month enjoying a vacation, after which he will return to New York. His translation of "Agricola" is now in press, and probably will be issued in about three months.

B. Magnus, general manager of the Electrolytic Refining Company, at Port Kembla, Australia, has been appointed general manager of the Mount Morgan Gold Mining Company, at Mount Morgan, Queensland. He will also continue to supervise the operations at the Electrolytic Refining Company's works.

MEMBER ELECTED IN SEPTEMBER

Finch, John Wellington.....730 Symes Bldg., Denver, Colo.
Consulting Mining Geologist and Engineer.

COMMITTEES.

Executive Committee.

H. M. CHANCE
J. PARKE CHANNING
J. R. FINLAY
W. R. INGALLS
H. S. MUNROE

Annual Medal.

H. S. MUNROE, *Chairman*
JAMES F. KEMP
ARTHUR L. WALKER

Mining Law.

H. V. WINCHELL, *Chairman*
C. W. GOODALE
M. L. REQUA

Panama-Pacific Engineering Congress.

E. H. BENJAMIN
F. W. BRADLEY
C. W. MERRILL

Professional Ethics.

B. B. LAWRENCE, *Chairman*
F. LYNWOOD GARRISON
S. W. MUDD

Professional Training.

A. L. WALKER, *Chairman*
S. B. CHRISTY
F. W. BRADLEY

Standardization.

C. R. CORNING, *Chairman*
ROBERT PEELE
HENNEN JENNINGS

Mining and Metallurgical Society *of America*



Bulletin Number Fifty-three
October 31, 1912
Vol. V, No. x

Published at the Office of the Secretary
305 Pearl St., New York.

OFFICERS FOR 1912.

President, J. PARKE CHANNING, 42 Broadway, New York.

Vice-President, J. R. FINLAY, 52 William St., New York.

Secretary, {
Treasurer, { W. R. INGALLS, 505 Pearl St., New York.

Executive Committee: Messrs. H. M. Chance, J. Parke Channing, J. R. Finlay, W. R. Ingalls and H. S. Munroe.

COUNCIL.

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Mining and Metallurgical Society *of America*

Vol. V

October 31, 1912.

No. 10

ANNOUNCEMENTS.

Back Numbers of the Bulletin.—The Secretary is still able to supply a limited number of bound volumes of the Bulletin for 1911 at \$1.50 a copy. Complete unbound sets of the bulletins for the same period can also be supplied. No complete sets of bulletins published previous to 1911 are now obtainable, but the Secretary has a few sets of the second volume (1910), which lack only Bulletin No. 26. If any members have copies of this bulletin which they do not need, the Secretary will be glad to receive them.

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Ballot.—The resolution respecting the U. S. Geological Survey and the U. S. Bureau of Mines, adopted by the council at its meeting on Oct. 17, might be submitted immediately to ballot of the members of the Society, under the rules; but there being no urgency about this, submission will be deferred until a ballot of the membership is required for some other purpose.

W. R. INGALLS,
Secretary.

MINUTES OF MEETINGS

NEW YORK.

The October meeting of the New York section was held, after an informal dinner, at the Chemists' Club, on Thursday, Oct. 17, at 8.30 p.m. The meeting was called to order by the Chairman, Mr. Stone.

Those present were: J. H. Allen, E. T. Conner, F. G. Cottrell, C. R. Corning, J. R. Finlay, L. D. Huntoon, H. C. Hoover, W. R. Ingalls, H. H. Knox, E. B. Kirby, H. S. Munroe, R. Peele, H. M. Payne, A. H. Rogers, M. B. Spaulding, G. C. Stone, L. D. Ricketts.

The Chairman.—The minutes of the last meeting having been printed in the Bulletin, unless there is some objection they will stand approved.

The subject for tonight is "Systems of Mine Taxation." I will ask Mr. Finlay to give us his ideas on the subject.

J. R. Finlay.—At the outset I must disclaim any special knowledge of the principles of taxation. All I have ever done was merely to work out a plan of valuation for tax experts to work on. However, I have at least come into contact with the subject and can perhaps pave the way for a discussion by bringing up the main facts I have observed.

How many schemes there may be for taxing mining property I have not the least idea. I know of three: (1) The plan, used in Michigan and Minnesota, of taxing on an ad valorem basis. (2) The plan, used in Colorado, Montana, Idaho and Nevada, of taxing each year's net income over expenditures. (3) The United States government plan of taxing the net "profits" of corporations. To these may be added a fourth plan, which seems widespread throughout the British Empire, of taking a fixed royalty on the output.

The first thing it occurs to me to point out is that there is a curious contradiction in the matter of mining taxation in both the British and American systems. In the British Empire the income tax has long been an established thing. In the United States it has always been contested in principle. But one must observe that the British royalty on output is a tax having no reference to income and quite independent of it, that is, of profitable income; while in all three of the American plans of taxation there is either a direct or an indirect relation to profitable income. This observation applies as a generalization only; no

doubt there are innumerable applications of the net income idea to the taxation of British mines.

I said a moment ago that in this country the taxation of mines bears a direct or indirect relation to profits. I should qualify this by saying that this is merely my personal observation. In Michigan and Minnesota, where the taxes are assessed upon valuations, those valuations have been, recently at least, a forecast of profits.

The difficulties of this *ad valorem* system are considerable. We all know how difficult it is to make an accurate valuation of a mine. We all know that an unprofitable mine is logically worthless. Great quantities of mineral land with divided ownerships can hardly be valued intelligently. No one on earth can tell either what they are worth for actual mining or what they will bring in the market. This is the difficulty, under this system, of making taxes equitable. The owner of one mine may successfully conceal its value by persuading the assessor that its future is doubtful. His neighbor, with better morals and better business judgment, who has developed his property far ahead, may suffer in comparison. The chance for inequality runs all along the line through every class of mining property.

But there is one thing to point out: the man who has an unprofitable enterprise enjoys as much protection from organized society as the owner of a bonanza. He should not be exempt from taxation during the long period which it may take to convince him that his scheme will not succeed. In any state which taxes on the *ad valorem* basis, therefore, it becomes the duty of the assessor to put some kind of a valuation on a property. It is frequently the case that whole communities depend on mining enterprises which turn out to be unprofitable; but no one would suggest that such places should get along without schools, roads, police and courts. Somebody must pay for these things and the man who is confident enough to invest his millions should be no more exempt from taxation on that investment than the small merchant who has confidence enough in the same enterprise to put up a store.

As a matter of fact, taxes are actually paid by a compromise agreement between local interests. The owners of mines do not escape taxation, but they do often wrangle about what is their share. The weakness of the *ad valorem* system is that there is no logical, sure, well understood method of fixing values.

I am not sure whether there is any profound difference in this respect between mines and other forms of property. Take manufacturing enterprises, or real estate. Would it not be

nearly as hard to value a town lot, or a factory that had not made good, as to value a mine that had proved unprofitable?

However, I do not see any appalling difficulty in applying an ad valorem system. What is needed is a central authority ready and able to apply some well defined rules. It seems to me that in a mining community taxes should be levied on some minimum valuation of land holdings and on all buildings and tangible investments, whether profitable or not, in some proportion to their cost. These taxes should be fundamental and could be made to cover local expenses. The mines themselves can be valued intelligently only after they have reached the profit making stage. They can then be valued with fair accuracy, but I think should be re-assessed each year.

This is not so big a task as would at first appear, for the number of profitable mines in each district which can be appraised for the value of their mining business per se is never very great. The work could be so systematized by means of periodic reports, and by the inspection of maps and new developments, that a properly qualified examiner could do the work at a very moderate cost.

Some taxes must be levied on an ad valorem basis everywhere, I suppose, in order to meet the conditions which I outlined when speaking of taxes that must be paid on property whether it is profitable or not. The chief reason for taxing mines also on that basis must be to conform with the underlying system.

The other systems of taxation are at first glance somewhat more attractive on account of their greater apparent fairness. Their weakness is that, inasmuch as taxes must be levied on property before it has become remunerative, taxes on profits alone can never be sufficient and can only supplement local ad valorem taxes of some kind. On the theory that the *business* of a mining company in contradistinction to its mere possessions, has value only if it is profitable, the system of taxing yearly net revenue can be made absolutely fair. The beauty of taxing net income is that it involves no necessity for making a valuation of the business.

As applied in the states of Idaho, Montana, Colorado and Nevada, the basis of taxation is taken as the difference between returns from output and expenditures on output. One might imagine that this difference could be determined by the simplest possible book-keeping; but this is not the case. The tax dodger can evolve some plan to beat nearly any law. The way they beat the income tax, or "bullion" tax, in Nevada is by creating a confusion about expenditures. A mine will own a mill, but it

will carefully put the mill into a separate corporation. The milling company will then charge the mine such treatment rates that the profits to the mine will be modest. For instance, the Tonopah Mining Company in 1909 paid \$1,400,000 in dividends, but the profit of the mine was reported at only \$360,000. The profit of the milling company was \$1,100,000 in that year.

A government tax on the net profits of corporations involves a calculation of "depreciation." This makes an opening for the artful dodger, who proceeds to imagine a depreciation on the value of the mine on some theory or other. If depreciation is confined to the cost of the plant and tangible equipment, of course no one can object; but if the depreciation is applied to some value put upon the mine it becomes the dizziest kind of a fake. The value of a mine, beyond the mere equipment, is the very profit that the tax is supposed to reach.

A royalty or "tonnage tax" is applied in many countries. I know little about its actual application. It appears to have some advantages from a public point of view—chiefly in the fact that it is broader in its scope than an income tax and that it is a harder tax to dodge.

Viewed in a general way, it would appear that local taxation must of necessity be raised by the ad valorem method, while income taxes, yielding a more fluctuating return, are more suitable to the needs of a state or a central government.

The Chairman.—We are very grateful to Mr. Finlay. Will Mr. Hoover now give us his ideas and tell us about the methods employed in the British Empire?

H. C. Hoover.—Taxation of mines in the British Empire rests upon an entirely different basis than that in the United States and, moreover, it varies greatly in different portions of the Empire. In America the mining laws were formulated at the apogee of the economic theory of *laissez faire*; as a result, the minerals were freely alienated to the individual, and thus, under the economic sentiment of that period, the state or community reserved scarcely any right in the minerals. Therefore the object of taxation is purely for the necessary state revenue, on the same conception as other property. It is scarcely necessary to repeat that the basis of American taxation is that of a percentage upon capital value.

In the British Empire the mining laws are to some extent either a survival of the period when the state or the crown claimed an interest in all minerals, or have been formulated during these latter days when that claim has been revived. More-

over, the general basis of taxation throughout most of the British Empire is upon income and not on capital. The tendency, therefore, is to employ taxation on minerals as a means to allow participation by the community in the minerals won, as well as to procure revenue.

In some states, such as West Australia and the Transvaal, for example, we find a series of taxes, in the shape of rents on mineral land, fees for various state services, and so on, which at least partially support the local government; but over-riding all this there is a stiff tax on profits won, varying from 5 to 10 per cent. In some Indian states, a gross royalty is demanded on minerals won, the origin of this system being mainly the conception that mineral ownership rests in the local prince, or the state, and that the working of mines pays tribute to the owner.

My own view of a basis of taxation is that the right of the community to an interest in its minerals should be recognized; in this country, in view of the alienation of the minerals, this right can be secured to the state only through some form of taxation; further than this, the miner should contribute his share to the cost of the local government like all other members of the community. As to the form of taxation, it appears to me that any system based upon the capital value of mines is open to the strongest objection, because it throws upon the local unskilled official the highly technical work of mine valuation. A gross royalty on minerals won, although easiest of assessment, is open also to objection because it would bear with great inequality upon different mines. For instance, a royalty of 20 cents per ton on a gold ore averaging \$4 per ton might mean 30 per cent. of the profit won, while the same royalty on ore worth \$50 might mean less than one per cent., and it is also probable that more capital pro rata would be employed in the first case than the second. Furthermore, a gross royalty would in many cases be a tax on unprofitable mining and would handicap the industry. A tax on profits, with due allowance for depreciation, is, in my view, the fairest basis, and assessment becomes a matter of accountancy, which is within the skill of local officials. A small additional tax on improvements, for purposes of purely local government, would also be a necessity.

W. R. Ingalls.—A statement by Mr. Finlay attracted my attention. Among the states in which taxation is based on valuation, Michigan and Minnesota are mentioned. There are several others: New Jersey, Louisiana, on the salt and sulphur mines, and in all coal sections throughout the country.

E. T. Conner.—The conception of value in coal mines varies widely. Usually it is a question of compromise between the operator or owner and the assessor.

W. R. Ingalls.—Among the states that are taxing on net income, Nevada, Idaho and Montana were mentioned, but I was not aware that this principle obtained in Colorado.

J. R. Finlay.—In Colorado the arrangement is like this: The state has the option of taxing a mining company a certain percentage of its total gross output or a certain percentage of its net profits, these net profits being the difference between receipts and expenditures.

L. D. Ricketts.—In Arizona a tax is levied on the physical value of a plant, in addition to a percentage of the bullion.

W. R. Ingalls.—Thus, four main systems of taxation exist in this country. In those states where taxation is on the net output, as in Idaho, Montana, and Nevada, I have never been able to reconcile the profits reported for taxation with those for dividend purposes.

E. T. Conner.—As for the coal in Pennsylvania, I will mention one particular instance with which I had something to do in the bituminous field. Lands that were owned by corporations, and undeveloped, were assessed at \$40 an acre. Internal blocks of land, not purchased by the corporations and still in the hands of farmers, were assessed at \$10 an acre. The argument put forth by the County Commissioner was that because the land had been purchased by a mining company it had greatly increased in value. In the anthracite regions, however, the same system does not apply. In no two counties is the same method used. However, in recent years attempts have been made to base taxes on the contents of the mines, on the approximate quantity of coal, but the matter is being bitterly contested by the coal corporations. The community is endeavoring constantly to raise the rate of valuation, and this is now being discussed in Lucerne county, where very large deposits of anthracite exist. The matter of systematizing taxation has never been worked out on broad lines.

J. R. Finlay.—In Michigan, taxation is on an ad valorem basis. I found that some mines, assessed on a valuation of \$120,000, had paid net profits of \$2,280,000 in five years. Another mine was assessed at \$4,500,000, but its net profits in five years were about the same. In this case, one property was

paying only 1 or 2 per cent. as much as the other. The local difference in the amount of taxes was not so great as that because the little mines paid about 80 per cent. of the taxation. The actual tax paid by the iron mines, which were assessed at a very low valuation, amounted to about 12c. per ton, say, on a product that was worth about \$2.60 per ton in the ground; hence they were paying about 5 per cent. of the gross value. The fault to be found with that system seems to be the inequalities between different districts.

H. H. Knox.—It seems to me that great confusion exists in this country, in that while we have a hundred different systems of taxation we have no principle. In Europe they have certain principles, but here taxes are assessed without regard to any fundamental ideas. In these days we are hearing a great deal about the interest of the state, and community rights in natural resources. It seems to me that if we would once reconcile opposing systems of taxation it would be a simple matter to return a part of the natural resources to the country.

E. B. Kirby.—I have found, just as everyone here has found, that operating mines are everywhere unjustly and oppressively taxed. The reason for this is that none of us likes to pay taxes, and as a consequence one is always shifting it on the other fellow. If there are more ranchers than miners in a state, then the ranchers shift it on to the miners. Another reason is that people always imagine that a mine is rich and can stand it.

When I began to look into this question and discussed it with politicians and others who had in their hands the making of the law, I found a chaotic mass of legislation on taxation, due entirely to the efforts of different sets of interests to shift the burden on one another. I found that during the last few years, particularly, there has been a strong tendency in all countries struggling with taxation problems and trying to improve their systems, to adopt the principle of taxing mineral resources.

My idea of shifting the burden would be to lay it on those who hold mining land for speculative purposes. Holding for speculative purposes I believe is harmful. What we are interested in, as engineers, is to have our mineral resources developed; hence any system that will make speculative holding expensive, and encourage operation, will be beneficial.

A. H. Rogers.—It seems to me that reconciliation should be effected between ad valorem systems and taxes on gross product. Mineral land is valuable for the mineral it contains.

The government of Mexico taxes claims whether they are worked or not. The charge is so much for each pertenencia. As long as you pay the tax you can hold the land, whether you work it or not.

R. Peele.—Mr. Finlay, in his original remarks, mentioned taxation of gold deposits of India on a tonnage basis. He was not certain whether that principle extended to the other metals or not. Mr. Hoover might say whether it is applied to other metals than gold and silver.

H. C. Hoover.—India is very complex. Some coal lands pay a royalty. In other sections the metalliferous lands belong to the various princes, who make the best bargain they can. India is no place for any generalization.

A. H. Rogers.—It seems to me taxation on the value of gross product more nearly reconciles all views.

J. R. Finlay.—The value must be based only on profits; when a mine makes no profits it cannot pay any tax, and will not.

E. B. Kirby.—It seems to me that we are not distinguishing between taxes and methods of assessing valuations. These are two different things, of course. The great difficulty in assessing is that we do not follow decisions and instructions, but various interests all try to twist matters and then we get into trouble. The true cash value of a property is what it would bring for cash, under normal conditions, and not under a forced sale.

J. R. Finlay.—I do not agree altogether with Mr. Kirby. It is not a simple thing to interpret the law as to the nature of true cash value. For example the Attorney General of Michigan came to me last summer with this question: Somebody had died, leaving an estate of, say, 1000 shares of Calumet & Hecla, which they wanted to assess on the value quoted on the stock exchange. The estate offered a certain amount of taxes, but the state contested it. The question was to ascertain what that stock could have been sold for within six months after the death of the man who held it. As a matter of fact, only about five shares of Calumet & Hecla stock a day is sold on the Boston stock exchange, and no one knows whether it is the same five shares or not. If you put a thousand shares on the market it would not be a simple matter to say what would be a fair cash value.

On motion, the meeting adjourned at 10 p.m.

L. D. HUNTOON,
Secretary of Section.

COUNCIL

A meeting of the Council of the Society, of which notice was given on Oct. 3, was held at the Engineers' Club, New York, Oct. 17, at 5 p.m. The members present were Messrs. Finlay, Ingalls, Munroe and Winchell. Mr. Ingalls held proxies from Messrs. Chance and Leggett. The total number of members present, in person and by proxy, was six, this constituting a quorum. In the absence of the President, J. R. Finlay, Vice-President occupied the chair.

The minutes of the meeting on July 8 having been sent by mail to all members of the council, and no objections having been received, were declared by the Vice-President to be approved as thus submitted.

Election Districts.—The Secretary reported that under date of Aug. 12, he sent to all members of the council the following letter:

"Article 8 of the by-laws of the Society provides as follows: 'The Council shall from time to time divide the territory occupied by the membership into 12 geographical districts to be designated by numbers. Each of the districts shall be, as nearly as practicable, contiguous territory, and each shall contain as nearly as practicable an equal number of members. The Council shall announce such division to the Society three months before the annual meeting.' I have made the division for 1913 as per the enclosed sheet, which division is the same as for 1912. Will you do me the favor to return to me at your first convenience the sheet enclosed herewith endorsed with your approval or disapproval."

The division referred to was as follows:

Membership eligible to vote, 223. Divided by 12 the quotient is approximately 18.7. Upon this basis the following division is made:

DISTRICTS:

1, 2, 3.	New York (48), New England (9).....	57
4, 5.	New Jersey (2), Pennsylvania (24), West Virginia (3), Ohio (3), Maryland (1).....	33
6.	District of Columbia (13), Southern States (3).....	16
7.	Michigan (7), Minnesota (3), Wisconsin (3), Illinois (1), Iowa (1), Missouri (6).....	21
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In reply to the Secretary's letter of Aug. 12, the following members of the Council expressed, in writing, their approval of the proposed division: Winchell, Kemp, Finlay, Lindgren Leggett, Mudd, Argall, Munroe, Garrison, Channing, Chance, Bradley and Ingalls; total 13, constituting a majority of the Council. Consequently the Secretary issued nomination papers on Oct. 14, in conformity with the above decision.

Upon motion, duly seconded, all the actions of the Secretary in the matter of the forthcoming election were approved.

Panama Exposition.—The Secretary presented correspondence relating to the participation of the Society in the Panama-Pacific International Exposition in San Francisco, in 1915, and especially a letter from James A. Barr, Secretary for Conventions and Learned Societies, under date of Sept. 13, 1912, renewing the invitation of the Panama-Pacific International Exposition to the Mining and Metallurgical Society to hold a meeting in San Francisco in 1915. Upon motion, duly seconded, and unanimously carried, the Secretary was instructed to communicate to Mr. Barr a letter, favorable in tone but without definitely committing the Society. The Secretary was further directed to confer with the standing committee of the Society on the Panama-Pacific Engineering Congress in regard to the participation of the Society in this Congress.

Survey and Mines Building.—The following resolution was offered for submission to the members of the Society as a resolution introduced by the Council, which, under the rules, may be put to vote before the members of the Society:

"WHEREAS, the work of the U. S. Geological Survey and of the U. S. Bureau of Mines is seriously hampered by the crowded condition of the buildings occupied by these organizations in Washington, and

"WHEREAS, these buildings have neither adequate floor space, proper laboratory facilities, protection of records against fire, nor room for collections, and

"WHEREAS, the buildings now occupied are situated in the noisiest part of the city, so that the efficiency of the members of these important bureaus is materially decreased,

"RESOLVED, that in the opinion of the Mining and Metallurgical Society of America these conditions should at once be remedied by the erection of a proper fireproof building, or buildings, to house the two bureaus, and that this building, or these buildings, should be of sufficient size and properly equipped for the needs of these two organizations, which are engaged in work valuable and essential to the mining industry; and that the building, or buildings, erected should be of an architectural design reflecting the importance and dignity of the mining industry."

A motion to adopt the above resolution having been duly seconded, it was put to vote and unanimously carried.

Oil-Land Legislation.—The Secretary reported that the following resolutions had been adopted by the San Francisco section and transmitted to the Council by the secretary of that section:

"1. There being no laws at present under which oil land can be acquired satisfactorily, a special Federal law should be enacted governing the acquirement of oil, gas, and asphalt lands, and all lands known or reasonably supposed to contain oil, gas, or asphalt should be disposed of only under the terms of the new law.

"2. From time to time as the desirability of maintaining a stable price for oil may in the opinion of the Secretary of Interior demand, oil, gas, and asphalt lands now reserved or hereafter withdrawn shall be thrown open to entry in blocks of such size as he shall determine. In fixing the size and position of the blocks, he shall recognize the principle that the pioneer may properly be allowed a larger area than the one who follows.

"3. Prior to the opening of any lands to entry, they shall be properly surveyed and suitably monumented, and they shall be divided into tracts of 160 acres.

"4. Leases upon the individual tracts shall be allotted by the Secretary upon the basis of competitive bids; the latter to be in terms of royalty offered, all royalties to be payable in parts of the product.

"5. Successful entrymen shall file with the Secretary a good and sufficient bond to the amount of \$10,000 for the faithful performance of the terms of the contract.

"6. Lessees shall commence drilling within a specified and agreed time, and all money expended upon the lease in bona fide effort to develop oil, gas, or asphalt, or to operate for oil, gas, or asphalt, shall apply to the extinguishment of the bond, and when the total amount so expended equals the amount of the bond, the latter shall be cancelled.

"7. Transfer of leases shall be valid only upon approval of the Secretary, and he may refuse approval whenever in his judgment such transfer would be contrary to public interest; but he shall not use this power of refusal as a means to exact increased royalty.

"8. The lessee shall drill each year an agreed number of wells or shall keep in operation an agreed number of strings of tools unless the local price of oil falls below a certain agreed price. If the lessee forfeits a lease, he shall retain his rights in all wells already drilled and may continue to produce from them so long as he pays the agreed royalty, and forfeited leases shall be immediately open to re-letting; provided no drilling shall be done within 300 feet of an existing well.

"9. Line wells must be drilled last except where it is necessary to protect a lease against adverse drilling.

"10. Net revenue from leasing the oil lands should go in large part to the state within which the lands are situated."

Accompanying these resolutions, the secretary of the San Francisco section forwarded a minority report urging substitution of the following for section 4:

"4. Leases upon the individual tracts shall be allotted by the Secretary upon the basis of drawing by lot. No tract shall be of less than 320 acres and no allotment shall be made unless, in the opinion

of the Secretary, the individual or the corporation acquiring the allotment is financially able, not only to develop the property completely, but also to care for it in the most scientific manner."

In recommending the substitution, Mr. Mark L. Requa, who made the minority report, presented the following argument:

"I am firmly of the belief that the oil lands of the United States now in Government ownership should, when developed, be placed only in the hands of large corporations. The most important factor governing my attitude is the menace of water. Small corporations operating without proper regard to geological conditions are more likely to create water troubles than large corporations under competent management. I believe the handling of the oil resources in this way would be the truest type of conservation; that our oil resources need conserving should go without saying, but I desire to offer the following comparison:

"Great Britain producing 250,000,000 tons of coal per annum is said to have sufficient resources to last 450 years at this rate of output. If California were to yield a quantity of oil equivalent to this in fuel value it would equal approximately 800,000,000 bbls. per annum, on which basis the California fields would be exhausted in probably 10 to 20 years. California is credited with from one-half to one-third of all of the oil of the United States. The United States is said to have sufficient coal to supply an output of 500,000,000 tons for 6,000 years. The conservation of coal is being constantly agitated. How much more vital is the conservation of oil can be understood by considering its relatively minute quantity as compared with coal and its relative importance as compared with coal. As a fuel for steam plants or internal-combustion engines, and as a lubricant, it has no competitor. The Diesel engine seems to be on the verge of revolutionizing power production, but in view of the limited oil resources how long will there be a fuel for such type of engine?

"I am aware that the concentration of the oil land of the country in the hands of a few large corporations will not be a popular suggestion to the politicians and possibly not to the public at large, but I am profoundly impressed with the belief that with such corporations properly regulated the ultimate results will be far more satisfactory than that attained by haphazard drilling by numberless more or less irresponsible corporations operating on tracts of from 20 to 100 acres."

The San Francisco section acted upon the above resolutions and minority report at its meeting on Sept. 9. The status of the matter is recorded in the minutes of the meeting of the San Francisco section, printed in Bulletin No. 52, Sept. 30, 1912, p. 155.

Upon motion, duly seconded, the resolutions adopted by the San Francisco section, and the minority report of the committee of that section, were referred to the standing committee of the Society on mining law.

There being no further business the meeting was then adjourned.

W. R. INGALLS,
Secretary.

PERSONALS

Joseph A. Holmes will be one of the principal speakers at the American Mining Congress in Spokane, November 25 to 30.

Milnor Roberts, dean of the College of Mines, University of Washington, Seattle, Wash., has returned to the university work after having spent the summer examining placer ground suitable for dredging, on Kenai River, Kenai peninsula, Alaska, for German capitalists.

Wm. Fleet Robertson returned to Victoria late in September, after having been on a three months' trip of investigation in part of Northern British Columbia, chiefly in the Groundhog coal basin, Upper Skeena River.

Mining and Metallurgical Society *of America*



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MINING AND METALLURGICAL SOCIETY OF AMERICA

OFFICERS FOR 1912.

President, J. PARKE CHANNING, 42 Broadway, New York.

Vice-President, J. R. FINLAY, 52 William St., New York.

Secretary, {
Treasurer, { W. R. INGALLS, 505 Pearl St., New York.

Executive Committee: Messrs. H. M. Chance, J. Parke Channing, J. R. Finlay, W. R. Ingalls and H. S. Munroe.

COUNCIL.

At large, ex-officio.

J. Parke Channing, 42 Broadway, New York.....Retires January, 1913
J. R. Finlay, 52 William St., New York.....Retires January, 1913
W. R. Ingalls, 505 Pearl St., New York.....Retires January, 1913

Districts 1-2-3.—New York and New England.

H. S. Munroe, Columbia University.....Retires January, 1913
T. H. Leggett, 25 Broad St.....Retires January, 1914
J. F. Kemp, Columbia University.....Retires January, 1915

Districts 4-5.—New Jersey, Pennsylvania, West Virginia, Ohio and Maryland.

H. M. Chance, Philadelphia.....Retires January, 1913
F. Lynwood Garrison, Philadelphia.....Retires January, 1915

District 6.—District of Columbia and Southern States.

Waldemar Lindgren, Washington.....Retires January, 1914

District 7.—Michigan, Minnesota, Wisconsin, Illinois, Iowa and Missouri.

H. V. Winchell, Minneapolis.....Retires January, 1914

District 8.—Colorado, Utah and Nevada.

Philip Argall, Denver.....Retires January, 1915

Districts 9-10.—Oregon, Alaska and California, except Los Angeles, Santa Barbara and Pasadena.

H. F. Bain, San Francisco.....Retires January, 1914
F. W. Bradley, San Francisco.....Retires January, 1915

District 11.—Arizona, Mexico, Texas, Oklahoma and those places in California not included in districts 9-10.

S. W. Mudd, Los Angeles.....Retires January, 1913

District 12.—Montana, Idaho, Washington and Canada.

C. W. Goodale, Butte.....Retires January, 1913

Mining and Metallurgical Society of America

Vol. V

November 30, 1912.

No. 11

ANNOUNCEMENTS.

Annual Meeting.—The fifth annual meeting of the Society will be held at the Engineers' Club, 32 West 40th St., New York, on Tuesday, Jan. 14, 1913. The first session will be at 2 p.m. and the second at 8.30 p.m. The annual dinner of the Society will be held in the Engineers' Club at 6 30 p.m. This will be informal. Members who cannot be present are requested to execute the proxy which accompanies this bulletin, and mail it to the Secretary.

San Francisco Section.—Regular meetings of the San Francisco section will be held on the first Monday of December, 1912, and of February and May, 1913. Other meetings may be held on call of the chairman.

Annual Medal.—The first award of the annual medal of the Society, under rules adopted by vote canvassed on Aug. 31, can not be made until the annual meeting of the Society in January, 1914. Under the rules the Secretary is required to send a circular letter to all members requesting suggestions as to the specific object for which the medal shall be awarded, and asking for nominations of candidates six months before the date of award. Such a circular letter will be issued in July, 1913.

Back Numbers of the Bulletin.—The Secretary is still able to supply a limited number of bound volumes of the Bulletin for 1911 at \$1.50 a copy. Complete unbound sets of the bulletins for the same period can also be supplied. No complete sets of bulletins published previous to 1911 are now obtainable, but the Secretary has a few sets of the second volume (1910), which lack only Bulletin No. 26. If any members have copies of this bulletin which they do not need, the Secretary will be glad to receive them.

Badge.—The badge of the Society, officially adopted by the council, may be obtained from the Secretary at a cost of \$5 when made in gold, silver and blue enamel; \$20 when made in gold, platinum and blue enamel. The badge may be obtained either as a pin or as a watch-charm. In ordering, be particular to state which form is wanted.

W. R. INGALLS,
Secretary.

MINUTES OF MEETINGS

NEW YORK.

A meeting of the New York section was held at the Chemists' Club, New York, on Nov. 21, at 8.15 p.m., preceded by a dinner at the club. The members present were Messrs. Munroe, Spilsbury, Finlay, Stone, Weed, Griffith, Ingalls, Kemp, Kirby, Riordan, Stoughton, Pomeroy and Dufourcq, together with Messrs. P. G. Spilsbury and Roberts Walker as guests. Mr. Stone, chairman, presided and Mr. Ingalls acted as secretary in the absence of Mr. Huntoon.

The chairman announced that the minutes of the meeting on Oct. 17, having been printed in Bulletin No. 53, would be approved as there printed if no objection were offered. No objection having been offered the minutes were declared approved.

The Chairman.—We shall make the subject of our discussion this evening the resolutions on oil land legislation that have been adopted by the San Francisco section. These resolutions were printed in Bulletin No. 53. I ask the secretary to read them.

The Secretary.—Before reading these resolutions with your permission I will summarize some paragraphs, especially the conclusions, from a report on the "Fuel Resources of California" by a committee of the Commonwealth Club of San Francisco, this committee consisting of Mr. M. L. Requa (chairman), Mr. F. W. Bradley and Mr. Walter Stadler. This report has lately come into my hands and will, I think, illuminate the point of view of the San Francisco section of this Society in the framing of its resolutions.

The Chairman.—Will you please read from this report?

The Secretary.—Mr. Requa's committee finds the things especially menacing the petroleum industry of California to be the following, stated in the order of their relative importance: (1) Influx of water into the oil formation; (2) competitive drilling, whereby one company offsets the wells of its neighbor; (3) unsatisfactory control of production by the marketing companies, permitting the production of unnecessary quantities of oil, with consequent loss through evaporation and seepage; (4) the undetermined disposition of government land. The committee recommends that the water danger be minimized by the establishments of commissions, supported by a fund of \$500,000

raised by a special tax per barrel of oil produced, this fund to be placed in the hands of the State Mining Bureau and to be distributed among the various fields in proportion to their production, boards of commissioners to be elected in each field by the companies operating therein, one vote being given for each acre of land owned; these boards to elect water supervisors to carry out the existing law.

Line drilling is a recognized waste in oil production. In the words of the committee, "Line drilling, frankly, is done to get something belonging to someone else, on the theory that if not done, it will be done by the other company." If a company drills in the corner of four adjoining pieces of land, the other three corners must be drilled or their owners will lose a certain quantity of their oil. The result is four wells, three of them forced by the drilling of the first one. The committee recommends that this practice be abolished and that drilling from the center of each piece of property be substituted by agreement **among the property owners.** The committee points out that it would be to the advantage of a company to drill from the center outward, inasmuch as the cost of operation would be materially decreased by having the wells as near as possible to a central operating plant, while the pipe lines would be of the minimum length and transportation from and to the warehouse would be minimized. The total quantity of oil extracted would ultimately be the same, with the added benefits that owners would cease drilling when the price of oil be low, without fear of having their territory drained. The committee proposes that this be accomplished by agreement, but suggests that possibly legislation can be enacted that will render such a method of drilling obligatory.

With respect to the control of production and market conditions, the committee says: "So far as the Sherman law is concerned, or so far as any of the recent efforts at trust regulation are concerned, there have been absolutely no benefits derived for the oil producers. On the contrary, conditions have been made worse. Under existing conditions, there is no possibility of getting the marketing companies together to agree upon any uniform policy." The committee thinks that this ought to be permitted, but does not see how it can legally be done.

The withdrawal of the government land is fully approved, there being no present need for its oil. When the oil is required it will no doubt be released, probably by a leasing system. "If such a leasing system is inaugurated," says the committee, "it should be as free and unhampered by government control as possible."

It will be observed from the above opinions that the dangers of water, the objection to line drilling, and, in general, the necessity for the exploitation of the petroleum resources of California by strong hands, colors the resolutions of the San Francisco section.

[The Secretary then read the San Francisco resolutions as published in Bulletin No. 53.]

W. R. Ingalls.—These resolutions I have read were adopted by the San Francisco section and were transmitted to the Council. With them came a minority report from Mr. Requa, which differed from the majority report in Section 4.

[Minority report was read as printed on pp. 168-169 of Bulletin 53.]

The Chairman.—I may say in regard to Section 1, that while there is no Federal law, there is at least a regulation in the Indian department under which the oil lands in Oklahoma have been leased, and these leases have been very satisfactory. I know that anyone in Oklahoma would rather have a lease from the Indians than direct. In case of litigation you get into the United States court instead of the State court.

D. M. Riordan.—I understand that no Federal law can be enacted which will affect any lands that are not directly owned by the government.

The Chairman.—In Texas it has often happened that the four legs of a derrick were in somebody's else property. The holdings of each person were so small that there was just room enough for the well, and the engine and the derrick were on adjoining property. The operators simply agreed that a man could put a derrick anywhere.

W. R. Ingalls.—The conditions in California, as compared with some other oil field, are magnified greatly by the depth of the wells. Whereas in some parts of the country wells can be put down for \$1,500 to \$2,000, in California the cost is from \$20,000 to \$40,000. If four people put down wells on adjacent corners there is a distinct economic waste. I think the suggestion that this committee makes as to the possibility of compelling drilling from the center by State enactment is rather interesting.

E. B. Kirby.—What impresses me in reading this carefully prepared resolution of our friends in California is the question

as to what is it that they and we are trying to accomplish. The aim of these resolutions, and of any endorsement we give them, is to procure some action by Congress. Now it seems to me that in determining the best form for such resolutions we should take into consideration the psychology of Congress. If therefore we omit demands which are impossible, it seems to me that both our California friends and ourselves are more likely to accomplish something practical. To illustrate, Mr. Requa has very frankly stated the reasons why he believes the oil business should be continued by large corporations. His reasons are very logical, and we could add a great many more. However, to procure the passage of any such idea through Congress is an utter impossibility. There is no use considering it. As to a choice between only enough area to stand a derrick on and a very large acreage, such as is suitable for a large corporation, we must make some compromise if we ever hope to accomplish anything. If I had anything to do with it I would leave the question blank, and say "a suitable area."

The Chairman.—The Society has already made recommendations in regard to the Alaska coal lands in which it assumed that a leasing system would be required and defined rules and terms under which leases should be made. In this case let us discuss the resolutions of the San Francisco section, and if we come to an agreement we can request the President to appoint a committee to draw resolutions and submit them to the Society for discussion and vote.

W. R. Ingalls.—These resolutions have already been in the hands of the Council and they have been referred to the standing committee on Mining Law, which committee will make a report. Therefore, what the chairman suggests has been anticipated, and any action this Section will take will be anticipatory of any action by the Committee on Mining Law.

[Section 2 was then read.]

D. M. Riordan.—Are any geological conditions taken into consideration in fixing the area?

The Chairman.—The principal consideration named in the resolutions is the desirability of maintaining a stable price; this seems rather large power to give the Secretary of Interior.

J. R. Finlay.—I think the provision for a bond of \$10,000 is a very proper one. Its object is to prevent small and irresponsible operators from taking land and keeping it.

D. M. Riordan.—If a man, after spending \$5,000, finds that the other \$5,000 would be absolutely wasted if spent on that ground, would he be bound to continue under penalty to spend the remaining \$5,000?

The Chairman.—That apparently is the meaning, but it does not seem fair.

H. S. Munroe.—I move that a provision be inserted to the effect that the bond shall be cancelled upon the surrender of a lease.

J. R. Finlay.—It seems to me that such a provision would defeat the object of demanding a bond. Undoubtedly the reason for the bond is to prevent land from being held for speculative purposes. I should think that if a man takes a lease, expecting to drill it, but finds afterwards that he had been acting on false information, and that the expenditure of \$10,000 would be an absolute waste, he should have a chance to back out and save his money. But speculation should be guarded against by a clause allowing him to cancel his lease within six months.

D. M. Riordan.—That would not provide for cancelling a lease after several thousand dollars had been spent. Suppose that a man has only \$11,000 and that he is willing to risk \$10,000, but that after spending \$3,000 or \$4,000 he finds there is no chance for him; he should be allowed to stop drilling and save the balance of his money.

E. B. Kirby.—If we were sitting as a committee of the House or of the Senate at Washington and this question were brought before us, how would we look at it, assuming we did not know very much about it? Would we not at once ask for precedents, and seek to learn what has been the practical way of arranging this matter between owner and operator? Consider the case of Oklahoma. There a prospective operator will pay an amount of cash down, say, \$250 an acre. No bond is given. It is a capitalized rental. One therefore will not buy any more than is necessary. In addition an operator will pay one-eighth royalty. Instances from actual practice will carry a great deal of weight and unless these resolutions show that the precedents have been carefully considered, their presentation will not be very successful. As to giving bonds, the effect of a bond in oil fields will be simply to throw the land into the hands of the well-to-do.

W. Griffith.—It seems to me that the simpler and the more automatic our laws can be made the better it will be all around. If a rental goes with the lease, this will prevent the holding of land for an indefinite time. If an operator does not pay his rental regularly he should forfeit his lease. Between two business men the question of leases would be a simple matter.

The Chairman.—Where the amount of rental varies, as in Oklahoma, the rental per acre is high in the developed field, while in the undeveloped field it is lower in proportion. It was by getting land at a low rental that some of the best lands in Oklahoma were discovered.

W. Griffith.—The objection to a high bond is that nobody will do any prospecting.

W. R. Ingalls.—This is prospecting in a field where prospecting is costly. Nobody can accomplish anything without spending \$20,000.

E. G. Spilsbury.—Why should a bond be required at all? A lease should contain a clause to the effect that no royalty would be due for six months or a year; after that a minimum royalty per acre would be required.

W. R. Ingalls.—This question of bond has nothing to do with the matter of royalty. In mining leases we find many cases in which bonds are required stating that a certain number of men must be kept employed in order to insure the development of the property. If the lessee fails to fulfil that provision he loses his lease. The bond idea is aimed at land grabbing. I believe that if an operator surrenders his lease, this should at the same time cause a surrender of the bond.

H. S. Munroe.—It might be well to express an opinion as to the amount of the bond. We are trying to frame a law, not for California, nor for any other state in particular. It might be that in some places a well would not cost more than \$1,500, in which case the bond should be in proportion to the work that is necessary. I move, therefore, that instead of stating the amount of the bond, we insert a clause leaving it to the discretion of the Secretary to require a bond sufficient to insure the performance of the necessary amount of work. (Motion seconded by Mr. Riordan.)

E. B. Kirby.—May I ask whether Prof. Munroe would accept an amendment in this form: That the Secretary have it

in his power either to reduce the amount of bond in special districts, or to substitute therefor a payment in proportion to the acreage, or a royalty on the acreage.

H. S. Munroe.—My motion was made on the supposition that the bond was to prevail. I think that Mr. Kirby's amendment might better take the form of an alternative proposition. My motion referred to the plan that had been formulated by the California section. I am afraid it would be like putting a rider in an appropriation bill to accept Mr. Kirby's amendment.

E. B. Kirby.—In order to get a parliamentary expression, I move an amendment to Prof. Munroe's motion, to read:

The Secretary shall also have the power to substitute for the bond a royalty in proportion to the acreage, or a payment in proportion to the acreage. (Amendment was seconded and defeated. A vote was next taken on Prof. Munroe's motion and carried.)

The Chairman.—If Mr. Kirby's motion were put as an alternative it might receive different recommendation.

H. S. Munroe.—My feeling is that Congress is not likely to put legislative power into the hands of an executive officer. Congress wants to make definite laws. I think the alternative should be put up to Congress, not to the Secretary. The two propositions are radically different. A bond simply requires active prosecution of the work, but does not involve any real money, except as far as money is spent for actual work. The proposition of Mr. Kirby is for an advance payment or for a large annual rental, which would be decidedly against the small producer.

E. B. Kirby.—I move that we introduce the following paragraph into the resolutions: The Secretary, in making these leases, is empowered, in cases where he thinks it advisable, to substitute for the aforesaid bond of \$10,000 either a bond in a less amount or an annual rental for the acreage reserved. (Motion was seconded by Mr. Riordan.)

W. R. Ingalls.—I think Mr. Kirby has the wrong idea in talking about the psychology of Congress. We are not trying to draft a set of rules that is likely to pass Congress, but rather a set of rules that Congress ought to pass. Whether they will or not pass is not the point, so far as we are concerned. We are not legislators. We are engineers, giving an opinion as to

what *ought* to be done.

Vote was taken on Mr. Kirby's motion, and carried. Section 4 was next read.

E. B. Kirby.—I move that for "320 acres" we substitute "an acreage to be fixed in each particular case by the Secretary." (Seconded by Mr. Riordan.) The 320-acre area has been fixed as the judgment of the men engaged in the California field. It has applied very successfully to operations there, and I see no fault with that figure in that field. In other districts, very often it would not be the proper acreage, as, for example, in various parts of Oklahoma.

Mr. Kirby's motion was carried, and section 6 was read. On motion of Prof. Munroe, section 6 was approved.

Section 7 was read, and, on motion of Mr. Riordan, was approved.

Section 8 was read, and, on motion of Mr. Riordan, was approved.

Section 9 was read, and, on motion of Mr. Riordan, was approved.

Section 10 was read, and, on motion of Prof. Munroe, was approved.

On motion, the meeting then adjourned at 10.30 p.m.

W. R. INGALLS,
Secretary of Section, pro. tem.

COUNCIL

A meeting of the Council of the Mining and Metallurgical Society, of which notice was given on Nov. 11, was held at the Engineers' Club, New York, at 5 p.m., Thursday, Nov. 21. The members present in person were Messrs. Finlay, Ingalls, Kemp, Leggett and Munroe. Mr. Ingalls represented Dr. Chance by proxy. The total number of members present in person and by proxy was seven, this constituting a quorum.

In the absence of the President, J. R. Finlay, Vice-President, occupied the chair. The minutes of the previous meeting, having been sent by mail to all members of the Council and no objections having been received, were declared approved as thus submitted.

Preparation of Official Ballot.—The Secretary reported that the nomination ballots, canvassed on Nov. 4, showed that for

president Mr. Channing had received the most votes: and Mr. Finlay, next, but both Mr. Channing and Mr. Finlay having declined to stand for this position, the official ballot was made out with the names of Messrs. Chance, Leggett and Walker, who came next in the number of votes. The official ballot issued to the members of the Society on Nov. 14, was as follows:

For President:

H. M. Chance
T. H. Leggett
A. L. Walker

For Vice-President:

H. M. Chance
J. R. Finlay
G. C. Stone

For Secretary-Treasurer:

C. H. Fulton
W. R. Ingalls
Robert Peele

For Councillor of District 1-2-3:

H. H. Knox
H. S. Munroe
Pope Yeatman

For Councillor of District 11:

T. B. Comstock
S. W. Mudd
W. F. Staunton
L. A. Wright

For Councillor of District 4-5:

H. M. Chance
W. Griffith
R. A. F. Penrose, Jr.
J. E. Spurr

For Councillor of District 12:

S. A. Easton
C. W. Goodale
J. B. Tyrrell
R. H. Sales

Upon motion, duly seconded, the actions of the Secretary in preparing and issuing the official ballot were approved.

Amendment of By-law No. 11.—Attention was called to imperfections in the process of making nominations by the terms of the present by-laws, especially in the cases of tie votes, of small votes scattered among a good many persons, and of persons nominated for several offices. Thus, in the nominations for this year, in order to conform to the by-laws, the list of names for the position of secretary had to be filled out of nine nominees for whom there was but one vote each. Again one person appears on the official ballot as candidate for president, for vice-president and for councillor. After some discussion, in which it was recognized unanimously that by-law No. 11 should be amended, the following substitute was drafted:

Three months before the annual meeting, the secretary shall send a nomination ballot to each member of the Society in the districts for which new councillors must be elected, with the request that he shall nominate three members, in such manner as the council may direct, as candidates for councillor to represent his district; and shall send a nomination ballot to each member of the Society entitled to vote, with the request that he shall nominate one member for president, one for vice-president and one for secretary. Nominations shall be received the Secretary. Sixty days before the annual meeting the Secretary for 20 days, when the polls shall be closed and the ballots counted by shall issue a ballot, containing in and for each of these districts not less than three names, and for the offices of president, vice-president and secretary, each, not less than three names, which shall be in each case those receiving the largest number of nominating votes. Provided, however, that the ballot may comprise less than three names for any office if less than three persons have been nominated for that office; and, moreover, that persons receiving less than seven votes for an executive office and less than three votes for councillor may be disregarded, and provided further, that no person may stand for more than one office, and when votes are cast for the same person for more than one office he shall be placed on the ballot only for that office for which he has the largest number of votes. The ballot prepared as thus directed shall be mailed to each member of the Society entitled to vote, who may vote for one councillor in each district, having the right to substitute names not on the list, and to cast not over three votes for a single candidate, provided that the total number of votes cast by such member shall not exceed the total number of vacancies to be filled; and who may cast one vote for president, vice-president and secretary, respectively, having the right to substitute names not on the list. The ballot shall be signed, sealed and voted as prescribed in by-law 16.

It was moved and seconded that the above draft be offered at the next meeting of the members of the Society as an amendment to the by-laws endorsed by the council. By order of the Vice-President this question was referred to the entire council by letter ballot, according to by-law No. 13.

Annual Medal.—Upon motion, duly seconded, the standing committee of the Society on annual medal was requested to take up the matter of obtaining a design for that medal and to report to the council as soon as possible.

Panama-Pacific Exposition.—The Secretary read a communication from James A. Barr, Manager of the Bureau of Conventions and Learned Societies of the Panama-Pacific International Exposition, in reply to the Secretary's letter to him under date of Nov. 9, 1912, written under instructions of the Council. The Secretary also reported conferences with Messrs. Merrill and Benjamin, members of the Panama-Pacific committee of the Society. The conclusion is that no definite information is at present possessed by anybody respecting plans for the

MINING AND METALLURGICAL SOCIETY OF AMERICA

participation of engineering societies in this exposition and nothing further remains to be done by the Mining and Metallurgical Society at present.

Union With A. I. M. E.—The Secretary presented the following communication from the American Institute of Mining Engineers:

Walter R. Ingalls, Secretary,
Mining & Metallurgical Society of America,
505 Pearl St., New York, N. Y.

Dear Sir:

I beg to advise you that on the authority of the Council and the Board of Directors of the Institute in joint session on Nov. 8, 1912, the President has appointed the following Special Committee of Five to confer with a similar Committee which may be appointed by the Mining and Metallurgical Society of America with the view of ascertaining the possibility of affiliating the two Societies under suitable rules and regulations;

James F. Kemp, Chairman; Albert R. Ledoux; James Douglas;
Charles F. Rand; William L. Saunders.

Yours respectfully,

(Signed) JOS. STRUTHERS,
Secretary.

Upon motion, duly seconded, and unanimously carried, the executive committee of the council of the Mining and Metallurgical Society was instructed to meet the committee of the A. I. M. E. to discuss the possibility of affiliating the two organizations under suitable rules and regulations.

There being no further business, the meeting was then adjourned.

W. R. INGALLS,
Secretary.

COMMUNICATIONS.

A member of the Society communicated the following letter to the Secretary under date of Oct. 28:

Referring to the ballot for officers of the Society: I held this a few days awaiting a chance to talk with other members here, and have just mailed it to you, after conferring with Mr. B——, and learning from him that he had voted for Mr. C—— for President. Mr. S—— asked me about the matter yesterday and he expressed a feeling which had been my own, viz., that some intimation should be given to distant members of the Society regarding candidates for the several offices, so that our votes would not be scattering. I did not have any idea

who would be a good man for vice-president, and therefore did not vote for any one. In future, I hope we may be advised regarding the names of men who are thought of for the offices of the Society, so that we may vote with more intelligence.

To this letter the Secretary replied:

The suggestion that you offer would be contrary to the spirit of the by-laws of the Society. It is sought to avoid official "slates" and everything of that sort. We have a system of direct primary, according to which every member has an opportunity to express his personal preference, and is expected to do so. The first papers issued by the Secretary are for this purpose. The three persons standing highest in the list of primary votes become the nominees, among whom the membership chooses in the election.

The above correspondence is printed here with the idea that it may perhaps be of interest to the members in general.

OTHER SOCIETIES.

Colorado Scientific Society.—At its meeting on Nov. 2, this Society, in response to an invitation from the chairman of the committee of consulting engineers of the U. S. Bureau of Mines on the prevention of accidents in metal mines, appointed a committee for suggestions and otherwise to give advice, particularly from the standpoint of operators and engineers in the Rocky Mountain region. The committee appointed comprises: Victor C. Hills (chairman), C. W. Comstock, Charles A. Chase, George E. Collins and A. J. Hoskin (secretary).

PERSONALS

Charles Butters arrived in New York late in October after an absence of several months in Europe. He then left for Cobalt, Ont., to be present at the beginning of operations at the Nipissing mill.

N. H. Darton presented a paper on "The Structure of the Northern Anthracite Basin Relative to Forms of Folds" before the New York section of the American Institute of Mining Engineers, on Nov. 22.

Dr. Henry S. Drinker has been chosen a member of the executive committee of the Water Conservation Association of Pennsylvania, and has accepted the appointment.

John T. Fuller is now Superintendent of Mines for the Canadian Copper Co., Copper Cliff, Ontario.

Dr. J. A. Holmes, director of the Bureau of Mines, sailed from New York, Nov. 2, for Panama, where he will investigate fuel questions affecting the supply for the canal works.

Communications addressed to J. Volney Lewis have been returned by the post office. The Secretary will be glad to be informed of his present address.

George W. Maynard is recovering from a severe illness at the Engineers' Club, New York. After professional work in Arizona and Colorado, he was taken ill while in Denver, and was brought from that city under the care of a physician.

F. L. Sizer has taken the position of general superintendent of the Mascot Copper Co., at Dos Cabezos, Arizona.

J. B. Tyrrell has returned to Toronto after having spent five months on the shores of Hudson Bay and in the country between Hudson Bay and the new railroad line of the Grand Trunk Pacific.

CHANGES IN ADDRESS.

Bradley, Philip R. 1022 Crocker Bldg., San Francisco, Cal.

Fuller, John T. Canadian Copper Co., Copper Cliff, Ont.

Lindgren, Waldemar, c/o Mass. Institute of Technology.

Boston, Mass.

Mining and Metallurgical Society *of America*



Bulletin Number Fifty-five
December 31, 1912
Vol. V, No. xii

Published at the Office of the Secretary
505 Pearl St., New York.

OFFICERS FOR 1912.

President, J. PARKE CHANNING, 42 Broadway, New York.

Vice-President, J. R. FINLAY, 52 William St., New York.

Secretary, {
Treasurer, { W. R. INGALLS, 505 Pearl St., New York.

Executive Committee: Messrs. H. M. Chance, J. Parke Channing, J. R. Finlay, W. R. Ingalls and H. S. Munroe.

COUNCIL.

At large, ex-officio.

J. Parke Channing, 42 Broadway, New York.....Retires January, 1913

J. R. Finlay, 52 William St., New York.....Retires January, 1913

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District 6.—District of Columbia and Southern States.

Waldemar Lindgren, Washington.....Retires January, 1914

District 7.—Michigan, Minnesota, Wisconsin, Illinois, Iowa and Missouri.

H. V. Winchell, Minneapolis.....Retires January, 1914

District 8.—Colorado, Utah and Nevada.

Philip Argall, Denver.....Retires January, 1915

Districts 9-10.—Oregon, Alaska and California, except Los Angeles, Santa Barbara and Pasadena.

H. F. Bain, San Francisco.....Retires January, 1914

F. W. Bradley, San Francisco.....Retires January, 1915

District 11.—Arizona, Mexico, Texas, Oklahoma and those places in California not included in districts 9-10.

S. W. Mudd, Los Angeles.....Retires January, 1913

District 12.—Montana, Idaho, Washington and Canada.

C. W. Goodale, Butte.....Retires January, 1913

OFFICERS OF SECTIONS.

SAN FRANCISCO.

S. B. Christy,
Chairman.

H. F. Bain,
Secretary.

NEW YORK.

Geo. C. Stone,
Chairman.

E. G. Spilsbury,
Vice-Chairman.
Louis D. Huntton,
Secretary.

PHILADELPHIA

R. H. Sanders,
Chairman.
F. Lynwood Garrison,
Secretary.

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ANNOUNCEMENTS.

Annual Meeting.—The fifth annual meeting of the Society will be held at the Engineers' Club, 32 West 40th St., New York, on Tuesday, Jan. 14, 1913. The first session will be at 2 p.m. and the second at 8.30 p.m. The annual dinner of the Society will be held in the Engineers' Club at 6.30 p.m. This will be informal.

Members who are intending to be present at the annual dinner are requested to promptly notify W. R. Ingalls, 505 Pearl St., New York.

San Francisco Section.—Regular meetings of the San Francisco section will be held on the first Monday of February and May, 1913. Other meetings may be held on call of the chairman.

Annual Medal.—The first award of the annual medal of the Society, under rules adopted by vote canvassed on Aug. 31, can not be made until the annual meeting of the Society in January, 1914. Under the rules the Secretary is required to send a circular letter to all members requesting suggestions as to the specific object for which the medal shall be awarded, and asking for nominations of candidates six months before the date of award. Such a circular letter will be issued in July, 1913.

Back Numbers of the Bulletin.—The Secretary is still able to supply a limited number of bound volumes of the Bulletin for 1911 at \$1.50 a copy. Complete unbound sets of the bulletins for the same period can also be supplied. No complete sets of bulletins published previous to 1911 are now obtainable, but the Secretary has a few sets of the second volume (1910), which lack only Bulletin No. 26. If any members have copies of this bulletin which they do not need, the Secretary will be glad to receive them.

Badge.—The badge of the Society, officially adopted by the council, may be obtained from the Secretary at a cost of \$5 when made in gold, silver and blue enamel; \$20 when made in gold, platinum and blue enamel. The badge may be obtained either as a pin or as a watch-charm. In ordering, be particular to state which form is wanted.

W. R. INGALLS, *Secretary.*

MINUTES OF MEETINGS SAN FRANCISCO.

The San Francisco section met after dinner at the Hotel Sutter, December 9, at 7 p.m., the following members and guests being present: S. B. Christy, chairman, C. W. Merrill, J. B. Keating, C. C. Brayton, S. E. Bretherton, C. C. Derby, Whitman Symmes, P. R. Bradley, E. L. Oliver, A. C. Lawson, H. F. Bain, E. T. Blake, J. N. Nevius, G. T. Edwards.

After calling the meeting to order the chairman introduced Mr. Edwards, who addressed the members on "The Title of the United States to the Public Lands."

This address provoked a lively discussion; upon motion, a unanimous vote of thanks was tendered Mr. Edwards for his courtesy in preparing the address.

Upon motion, it was voted that the dates of regular meetings as previously fixed, namely, the first Monday in September, December, February, and May of each year, be confirmed.

The secretary presented blank proxies and read a letter from the Secretary of the Society explaining why it was desirable for all members not attending the annual meeting to send proxies.

Upon motion, it was held to be the sense of the meeting that affiliation of the Mining and Metallurgical Society with the American Institute of Mining Engineers was desirable, and the Executive Committee of the Society was requested to keep the members fully informed as to negotiations conducted to that end.

The meeting then adjourned.

H. FOSTER BAIN,
Secretary of Section.

COUNCIL

A meeting of the Council, of which notice was given on Dec. 7, was held at the Engineers' Club, New York, on Thursday, Dec. 19, at 5 p.m. The members present were Messrs. Chance, Finlay, Ingalls, Kemp, Leggett and Munroe, a total of six, this constituting a quorum. In the absence of the President, Mr. Finlay, Vice-President, occupied the chair.

The minutes of the meeting on Nov. 21, having been sent to all members of the council, and no objections having been received, were declared approved as thus submitted.

Upon motion, duly seconded, and unanimously carried, the dates and arrangements for the fifth annual meeting of the Society, made by the Secretary and reported in Bulletin No. 54, were approved and confirmed.

Amendment to By-Law 11.—The Secretary reported the result of the letter ballot of the Council upon the proposed amendment to by-law No. 11, entered in the minutes of the Council meeting on Nov. 11, and printed in Bulletin No. 54, p. 181. Votes were received from Messrs. Argall, Bain, Chance, Finlay, Garrison, Goodale, Ingalls, Kemp, Leggett, Lindgren, Mudd and Munroe, a total of 12, all in the affirmative, no negative votes being received. Having verified the ballots, the Vice-President declared that a majority of the council having thus expressed itself favorably, the motion to introduce the proposed amendment to the by-laws, with the endorsement of the council, was carried.

Affiliation with A. I. M. E.—The Secretary reported, on behalf of the Executive Committee, that the committee, acting under instructions of the Council, met a committee of five members appointed by the directors and council of the A. I. M. E. to consider the possibility of uniting the Society and the Institute. The joint committee held two meetings, the first on Nov. 29 and the second on Dec. 6. At the first meeting were present Messrs. Douglas, Ledoux, Kemp, Saunders, Chance, Finlay, Munroe and Ingalls. At the second meeting, the same were present with the exception of Professor Munroe. At the second meeting it was voted unanimously to recommend to the respective governing bodies a plan of union.

[This plan will be published after action upon it has been taken by the Council.]

In the discussion of the report, the opinions expressed at the meeting were unanimously favorable. Upon motion, duly seconded, and unanimously carried, it was voted that the report of the Executive Committee be recorded in the minutes of the Council, and that it be noted in the minutes that it was the sense of the meeting that the proposed plan of union with the American Institute of Mining Engineers should be adopted. In view of the importance of the matter, the Vice-President directed that the proposed memorandum of terms of agreement be referred to the entire Council for letter ballot, vote to be canvassed on Jan. 14, 1913.

The Secretary reported receipt from the San Francisco section of minutes of its meeting on Dec. 9, comprising a resolution that it was the sense of that meeting that affiliation of the Mining and Metallurgical Society with the American Institute of Mining Engineers is desirable, and that the Executive Com-

mittee of the Society is requested to keep the members fully informed as to negotiations conducted to that end. The Vice-President directed this expression of opinion to be noted in the minutes of the Council meeting.

Patent Legislation.—The Secretary reported receipt from the American Institute of Electrical Engineers of resolutions adopted by its board of directors with respect to legislation modifying the patent system of the United States, now pending before Congress. These resolutions were read. It was proposed that the Mining and Metallurgical Society of America adopt the same set of resolutions, substituting only the name of the Mining and Metallurgical Society of America for the American Institute of Electrical Engineers, as follows:

WHEREAS, There are pending before the Congress numerous bills affecting and greatly modifying the patent system in the United States, and

WHEREAS, The patent system has been, and is, a tremendous factor in building up the present industrial prosperity of this country, thereby greatly contributing to the prosperity of the country as a whole, and

WHEREAS, Any untoward change in the patent situation might disastrously affect this condition of industrial and general prosperity, and the conditions contributing to their continual augmentation, and

WHEREAS, In view of the intimate relation of the patent system to the general welfare, no action looking toward any radical change in the patent system should be taken without most careful consideration, and

WHEREAS, In our opinion, proper consideration of such important changes as are proposed can be had only by an unbiased, non-partisan commission, made up of men from various walks of life and not from any one vocation, or interest,

BE IT RESOLVED, That the Mining and Metallurgical Society of America, respectfully urges the Congress of the United States that they provide for a Commission, made up of unbiased, independent, non-partisan men of such national standing as will command the respect of the whole country; and chosen from different walks of life; and not more than one from any one calling or interest; and serving without pay. Such Commission to hold public hearings, and otherwise, as may appear to them best, to make a thorough and careful study of the American patent situation, and to prepare and submit a comprehensive report and recommendations to Congress for such changes, if any, as may, as the result of their study, appear to them expedient, whether in the Patent Office, in the method of court procedure, or in the organic patent law, and recommendations as to the legislation they would propose for effecting said changes. And that we further respectfully urge that the Congress make ample provision for the expenses of said Commission, and

BE IT RESOLVED, That we respectfully urge the Congress of the United States to hold in abeyance all proposed legislation affecting the patent system in whatsoever way until such time as the said Commission shall have had ample opportunity to hold the said hearings, and make the said study and report, and

BE IT FURTHER RESOLVED, that these resolutions be printed and a copy be sent to each Senator and Representative of the United States who is a member of the Senate or House Committee on Patents.

It was moved and seconded that the above resolutions be put to vote of the membership of the Society as resolutions introduced by the Council, in conformity with the rules and regulations governing action in such matters, and this motion was unanimously carried.

The Vice-President called a meeting of the Council on Jan. 14, 1913, at 12.30 p.m., at the Engineers' Club, New York.

There being no further business, the meeting was then adjourned.

W. R. INGALLS,
Secretary.

OTHER SOCIETIES.

A committee was appointed by the council of the American Society of Mechanical Engineers to draft a code of ethics for adoption by that society with the hope that eventually a uniform code would be adopted by all of the engineering societies. On December 6 this committee submitted its proposed code as follows:

The basis of the present code is that adopted by the American Institute of Electrical Engineers and that now before the Boston Society of Civil Engineers for adoption, with additional sections, one in particular providing for a new standing committee of the Society. It has seemed to the Committee that any code which could be drafted would need to be improved, modified and added to by the results of experience, and that this work is important enough to the profession's welfare so that a special committee might well devote time to it. Such a committee would be in effect an arbitration committee, and its decisions would serve to put on record the consensus of the profession as to what constitutes honorable professional conduct.

In presenting the proposed code to the Council, the Committee emphasizes the fact that no code can define the duties and obligations of engineers under all possible circumstances and the proposed code merely attempts to cover those relations concerning which questions most frequently arise in engineering practice.

The Committee also urges that since the maintenance of honorable professional conduct by its members is as important to the welfare of the profession as wide knowledge and sound judgment on technical matters, it is as proper a function of the Society to furnish its member with some guide as to proper standards of professional conduct as it is to aid them by the formulation of standards relating to technical matters.

The code follows:

PRELIMINARY DRAFT OF CODE OF ETHICS.

A.—GENERAL PRINCIPLES.

1. It is not assumed that this code shall define in detail the duties and obligations of engineers under all possible circumstances. It is an axiom that engineers in all their professional relations should be governed by principles of honor, honesty, strict fidelity to trusts imposed upon them and courteous behavior toward all. The following sections are framed to cover situations arising most frequently in engineers' work.

2. It is the duty of engineers to satisfy themselves to the best of their ability that the enterprises with which they become identified are of legitimate character. If an engineer after becoming associated with an enterprise finds it to be of questionable character, he should sever his connection with it as soon as practicable, avoiding in so doing reflections on his previous associates.

B.—THE ENGINEER'S RELATIONS TO CLIENT OR EMPLOYER.

3. The engineer should consider the protection of a client's or employer's interests his first obligation, and therefore should avoid every act contrary to this duty. If any other consideration, such as professional obligations or restrictions, interfere with his meeting the legitimate expectation of a client or employer, the engineer should so inform him.

4. An engineer cannot honorably accept compensation, financial or otherwise, from two or more parties having conflicting interests without the consent of all parties. The engineer, whether consulting, designing, installing, or operating, must not accept commissions, directly or indirectly, from parties dealing with his client or employer.

5. An engineer called upon to decide on the use of inventions, apparatus, or anything in which he has a financial interest, should make his status clearly understood by those employing him.

6. An engineer in independent practice may be employed by more than one party, when the interests of the several parties do not conflict; and it should be understood that he is not expected to devote his entire time to the work of one, but is free to carry out other engagements. A consulting engineer permanently retained by a party, should notify other prospective clients of this affiliation before entering into relations with them, if, in his opinion, the interests might conflict.

7. Before any consulting engineer takes over the work of another consulting engineer he should ask the client his reasons for desiring to change engineers and unless the consulting engineer is entirely satisfied that the client has good and sufficient reasons for making the change he should confer with the present incumbent before accepting the work.

8. Consultations should be encouraged in cases of doubt or unusual responsibility. The aim should be to give the client the advantage of collec-

tive skill. Discussions should be confidential. Consulting engineers should not say or do anything to impair confidence in the engineer in charge unless it is apparent that he is wholly incompetent or the interests of the profession so require.

9. Engineers acting as experts in legal and other cases, in making reports and testifying, should not depart from the true statement of results based on sound engineering principles. To base reports or testimony upon theories not so founded is unprofessional.

10. An engineer should make every effort to remedy dangerous defects in apparatus or structures or dangerous conditions of operation, and should immediately bring these to the attention of his client or employer. As failure of any engineering work reflects upon the whole profession, every engineer owes it to his professional associates as well as to himself that a reasonable degree of safety be provided in all work undertaken.

C.—OWNERSHIP OF ENGINEERING RECORDS AND DATA.

11. It is desirable that an engineer undertaking for others work in connection with which he may make improvements, inventions, plans, designs or other records, should first enter into an agreement regarding their ownership.

12. If an engineer uses information which is not common knowledge or public property, but which he obtains from a client or employer, resulting in plans, designs, or other records, these should be regarded as the property of his client or employer.

13. If a consulting engineer uses only his own knowledge, or information which by prior publication, or otherwise, is public property and obtains no engineering data from a client or employer, except performance specifications or routine information; then in the absence of an agreement to the contrary, the results in the form of inventions, plans, designs, or other records should be regarded as the property of the engineer, and the client or employer should be entitled to their use only in the case for which the engineer was employed.

14. All work and results accomplished by an engineer in independent practice in the form of inventions, plans, designs, or other records, which are outside of the field of engineering for which a client or employer has retained him, should be regarded as the engineer's property unless there is an agreement to the contrary.

15. When an engineer or manufacturer builds apparatus from designs supplied to him by a customer, the designs remain the property of the customer and should not be duplicated by the engineer or manufacturer for others without express permission. When the engineer or manufacturer and a customer jointly work out designs and plans or develop inventions, a clear understanding should be reached before the beginning of the work regarding the respective rights or ownership in any inventions, designs, or matters of similar character, that may result.

16. Any engineering data or information which an engineer obtains from his client or employer, or which he creates as a result of such information, must be considered confidential by the engineer; and while he is justified

in using such data or information in his own practice as forming part of his professional experience, its publication without express permission is improper.

17. Designs, data, records and notes made by an employe and referring exclusively to his employer's work, should be regarded as his employer's property.

18. A customer, in buying apparatus, does not acquire any right in its design, but only the use of the apparatus purchased. A client does not acquire any right to the plans made by a consulting engineer except for the specific case for which they were made unless there is an agreement to the contrary.

D.—THE ENGINEER'S RELATIONS TO THE PUBLIC.

19. The engineer should endeavor to assist the public to a fair and correct general understanding of engineering matters, to extend the general knowledge of engineering, and to discourage the appearance of untrue, unfair or exaggerated statements on engineering subjects in the press or elsewhere, especially if these statements may lead to, or are made for the purpose of, inducing the public to participate in unworthy enterprises.

20. Technical discussions and criticisms of engineering subjects should not be conducted in the public press, but before engineering societies or through technical publications.

21. It is desirable that the first technical descriptions of inventions, or other engineering advances should not be made through the public press, but before engineering societies or through technical publications.

22. It is unprofessional to give an opinion on a subject without being fully informed as to all the facts relating thereto and as to the purposes for which the information is asked. The opinion should contain a full statement of the conditions under which it applies.

23. Engineers engaged in private practice should limit their advertising to professional cards and modest signs in conformity with the practice of other professions.

E.—THE ENGINEER'S RELATIONS TO THE ENGINEERING FRATERNITY.

24. The engineer should take an interest in and assist his fellow engineers by exchange of general information and experience, by instruction and similar aid, through the engineering societies, the engineering schools, or other means. He should endeavor to protect all reputable engineers from misrepresentation.

25. The engineer should take care that credit for engineering work is attributed to those who, so far as his knowledge of the matter goes, are the real authors of such work.

MINING AND METALLURGICAL SOCIETY OF AMERICA

26. Criticism of the work of one engineer by another should be broad and generous with the facts plainly stated. The success or failure of one member reflects credit or discredit on the whole profession.

27. The attitude of superiors toward subordinates should be that of helpfulness and encouragement. The attitude of subordinates to superiors should be one of loyalty and diligent support. The treatment of each by the other should be open and frank.

28. The attitude of an engineer toward contractors should be one of helpful coöperation. Tact and courtesy should be combined with firmness. An engineer should hold a judicial attitude toward both parties to a contract for whose execution he is responsible.

29. An engineer in responsible charge of work should not permit non-technical persons to over rule his engineering judgment on purely engineering grounds.

F.—INTERPRETATION.

30. If two or more engineers, members of this Society, disagree as to the interpretation of this code, or as to the proper rules of conduct which should govern them in professional relations to each other, they may agree to refer the matter to a standing committee of the Society on the interpretation of the code. Each party shall submit a statement of his position in writing, and the committee shall render a decision. A permanent record shall be made of the cases so submitted and decided.

31. Amendments or additions to this code may be made by the standing committee on interpretation of the code, subject to the approval of the Council.

CHAS. WHITING BAKER, *Chairman,*

CHAS. T. MAIN,

E. D. MEIER,

SPENCER MILLER,

C. R. RICHARDS,

Committee on Code of Ethics.

PERSONALS

F. W. Bradley was a delegate from Alaska at the California Miners Association meeting.

Corey C. Brayton has returned to San Francisco from Nome.

J. Parke Channing has returned from Europe.

H. C. Hoover has been elected a member of the board of trustees of Leland Stanford University.

J. P. Hutchins was recently engaged in examination work on mines for the Cabinet of the Czar of Russia, in consultation with the engineers of the cabinet.

Joseph Hyde Pratt was re-elected president and treasurer of the Southern Appalachian Good Roads Association.

Morril B. Spaulding is now manager of the Pittsburg district for the Crocker-Wheeler Co., with headquarters in the Oliver Building, Pittsburg.

CHANGES IN ADDRESS

Hoffmann, A. Handtverkargatan 16, Stockholm, Sweden

Huntley, D. B. Apt. 12, Concepcion del Oro, Zac., Mex.

Mann, W. S. San Juancito, Honduras, C. A.

Spaulding, M. B. Oliver Bldg., Pittsburg, Pa.

Mining and Metallurgical Society *of America*

CONSTITUTION

BY-LAWS

RULES

OFFICERS

MEMBERS

January 1, 1912.

505 Pearl St., New York.

OFFICERS FOR 1912.

President, J. PARKE CHANNING, 42 Broadway, New York.

Vice-President, J. R. FINLAY, 52 William St., New York.

Secretary, } W. R. INGALLS, 505 Pearl St., New York.
Treasurer, }

Executive Committee: Messrs. H. M. Chance, J. Parke Channing, J. R. Finlay, W. R. Ingalls and H. S. Munroe.

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District 7.—Michigan, Minnesota, Wisconsin, Illinois, Iowa and Missouri.

H. V. Winchell, Minneapolis.....Retires January, 1914

District 8.—Colorado, Utah and Nevada.

Philip Argall, Denver.....Retires January, 1915

Districts 9-10.—Oregon, Alaska and California, except Los Angeles, Santa Barbara and Pasadena.

H. F. Bain, San Francisco.....Retires January, 1914
F. W. Bradley, San Francisco.....Retires January, 1915

District 11.—Arizona, Mexico, Texas, Oklahoma and those places in California not included in districts 9-10.

S. W. Mudd, Los Angeles.....Retires January, 1913

District 12.—Montana, Idaho, Washington and Canada.

C. W. Goodale, Butte.....Retires January, 1913

OFFICERS OF SECTIONS.

NEW YORK.

SAN FRANCISCO.

S. B. Christy,
Chairman.
H. F. Bain,
Secretary,

Geo. C. Stone,
Chairman.

E. G. Spilsbury,
Vice-Chairman.
Louis D. Huntton,
Secretary.

PHILADELPHIA.

R. H. Sanders,
Chairman.
F. Lynwood Garrison,
Secretary.

CONSTITUTION.

Amended, Oct. 4, 1911.

1—NAME.

The name of the association shall be MINING AND METALLURGICAL SOCIETY OF AMERICA.

2—OBJECTS.

The society shall have for its objects the conservation of mineral resources, the advancement of mining and metallurgical industries, the better protection of mine investors and mine workers, the increase of scientific knowledge, and the encouragement of high professional ideals and ethics.

3—MEMBERSHIP.

The society shall comprise honorary members, and members who must be qualified by knowledge, experience, and honorable standing to advance the objects of the society, and shall be proposed for, and elected to, membership as provided in the by-laws of the society.

4—MEMBERS.

All interests in the property of the society of persons resigning, or otherwise ceasing to be members, shall vest in the society. No member or officer shall receive salary, compensation, or emolument unless authorized by the by-laws, or by concurring vote of two-thirds of the council. Members residing for a year or more beyond the limits of the United States, Canada and Mexico, shall not be entitled to vote nor to hold office during the period of such residence.

5—OFFICERS.

The affairs of the Society, subject to the provisions of the constitution and by-laws, shall be managed by a council of fifteen members, who shall hold office for the prescribed term or terms. The executive officers of the Society shall be a president, a vice-president, and a secretary (who shall also be treasurer), which officers shall be members of the council ex-officio, and shall hold office for one year, or until the close of the meeting at which their successors in office are elected, except that the secretary shall

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hold office until his successor accepts transfer of the duties of that office. Additional officers may be elected by the council from time to time if necessary for the purposes of the Society. All officers shall be eligible for re-election. Vacancy in the office of president shall be filled by the vice-president, who shall then become president, and the council shall forthwith elect a vice-president; and if necessary shall elect a member of council, of which the number must always be fifteen.

6—ANNUAL MEETING.

The annual meeting of the society shall be held on the second Tuesday in January of each year. One-third of the members, present in person or by proxy, shall constitute a quorum for the transaction of business.

7—RULES.

The society may adopt by-laws, rules and regulations for the conduct of its business, provided that these are in harmony with this constitution, and may provide different methods for amending or repealing such by-laws, rules and regulations.

8—AMENDMENTS.

Amendments to the constitution may be presented at a regular or business meeting of the society; and if endorsed by the council, or in writing signed by at least twenty members, a copy of such proposed amendment shall be sent to all entitled to vote, accompanied by comment by the council if it so elects, at least thirty days in advance of a second meeting called for its consideration; at which meeting the amendment may be amended as to wording but not as to intent, and then shall be submitted to a final vote by sealed letter ballot sent to all members; the polls shall be open for sixty days, and for the adoption of the amendment a majority of those entitled to vote shall be required to have been recorded in the affirmative; provided, however, that a negative vote comprising a majority of the votes cast shall defeat the amendment. If the necessary vote for adoption or for rejection is not secured on the first ballot, the council shall order the sending of a second ballot by registered mail to members who have not recorded their vote; and in such case, so many of these second ballots as have been received by members, if not voted within a further period of sixty days shall be counted as votes cast in the affirmative. The ballots shall be voted, canvassed and announced as provided in the by-laws.

BY-LAWS.

Amended Sept. 5 and Oct. 4, 1911.

I—ADMISSION TO MEMBERSHIP.

A candidate for membership or two members proposing him shall submit, in such form and in such detail as may be prescribed in the rules and regulations of the council, a record of his training and practice. The candidate must have had eight years' practical or professional experience, including not less than five years in positions of responsibility in mining or allied lines of work. Graduates of approved engineering schools shall be credited with one-half the time prescribed for graduation. The candidate must be endorsed by three or more members who shall further certify in writing as to his qualifications for membership. These statements must be based on long or intimate personal knowledge, and shall be submitted in such manner as the council may direct. The names of the candidates, after approval by a duly appointed committee of the council, shall be submitted to all members of the society entitled to vote, with the request that said members of the society present in writing, promptly, any objections that they may have against a candidate on the list. Thirty days after the mailing of the list, the committee of the council shall consider the communications received from members of the Society, and with the approval of the committee, the secretary of the Society shall then submit the name of the candidate to the whole council for secret letter ballot. The affirmative votes of a majority of the council shall be required to elect, but three adverse votes, received within thirty days, shall be sufficient to defer the election of any candidate, and the council may include the name of any such candidate on the ballot for any subsequent election of members. The application of any candidate shall be considered as pending unless it be withdrawn, or unless by a majority vote of the council the candidate be rejected. A candidate may renew his application a year or more after his rejection.

2—ADMISSION TO HONORARY MEMBERSHIP.

Honorary members, not to exceed ten in number, must be proposed in writing, setting forth at length the qualifications of the candidate, and signed by at least twenty members of the society. The candidate must be elected by vote of the council which shall be by sealed letter ballot. One dissenting vote shall defeat such election. Honorary members are not entitled to vote nor to hold office and shall not be required to pay initiation fees nor annual dues.

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3—SUBSCRIPTION TO CONSTITUTION AND BY-LAWS.

All elected candidates shall be duly notified, and shall subscribe to the constitution and by-laws in such form as the council may direct. This latter provision shall not apply to honorary members. The membership of any person shall date from the day of his election.

4—INITIATION FEE.

There shall be an initiation fee of twenty-five dollars for each new member after the total membership shall have reached two hundred and fifty.

5—ANNUAL DUES AND LIFE MEMBERSHIP.

The annual dues shall be ten dollars, payable in advance on the first day of January of each year. Persons elected after nine months of any year have expired shall pay only one-half of the dues for that year. The council may, for sufficient cause, remit the whole or part of dues in arrears. The executive committee of the council may drop from membership any member more than one year in arrears for annual dues, but may reinstate such member at its discretion. The council shall permit any member, not in arrears, to become a life member on payment of a sum deemed adequate for the purpose by the council, and based on his expectation of life according to reliable tables of mortality. Such life membership and initiation fees shall be invested, and the income only shall be applied to the current expenses of the Society.

6—RESIGNATIONS.

Any member, not in arrears in payment of dues, may terminate his connection with the society by sending his resignation in writing to the secretary.

7—DISCIPLINE.

The membership of any person in the society may be suspended or terminated for reasons of weight by a four-fifths vote of the council. Notice of such intended action shall be sent to such member by registered mail, and action shall not be taken for at least thirty days after the receipt of this notice by such member. A member suspended or expelled may demand a sealed letter ballot sustaining the action of the council. This ballot shall be sent to all members entitled to vote and may be accompanied by a statement signed by the council or a committee thereof, and by a statement on behalf of the accused of not more than one thousand words, or not exceeding in length

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that prepared by or for the council. A majority of the votes received within thirty days shall be required to reverse the action of the council.

8—ELECTION DISTRICTS.

The council shall from time to time divide the territory occupied by the membership into twelve geographical districts to be designated by numbers. Each of the districts shall be, as nearly as practicable, contiguous territory; and each shall contain as nearly as practicable an equal number of members. The council shall announce such division to the Society three months before the annual meeting. The council shall consist of the president, the vice-president and the secretary; and of twelve members, elected one from each district, and the terms of office of such twelve councillors shall be arranged so that four of them shall expire each year.

9—OFFICERS.

The officers of the Society, as provided in the constitution, shall be elected as hereinafter provided, except that whenever a vacancy occurs it shall be filled by a majority vote of the council. Their respective terms of office shall begin at the close of the meeting at which they are elected. The duties of the several officers shall be such as usually attach to the office, or such as may be determined by the council. The council may delegate its powers to persons or committees, and may make such rules and regulations as may be necessary for the proper conduct of the business of the Society, provided that these are in harmony with the constitution and by-laws.

10—COUNCILLORS.

The term of office of a councillor shall begin immediately upon election. Vacancies occurring at any time in the council may be filled until the next annual election by a majority vote of the remaining members. At the next annual election new councillors shall be elected to fill such vacancies for the unexpired terms of office only.

11—NOMINATIONS

Three months before the annual meeting, the secretary shall send a nomination ballot to each member of the Society in the districts for which new councillors must be elected, with the request that he shall nominate three members, in such manner

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as the council may direct, as candidates for councillor to represent his district; and shall send a nomination ballot to each member of the Society entitled to vote, with the request that he shall nominate one member for president, one for vice-president and one for secretary. Nominations shall be received for twenty days, when the polls shall be closed. Sixty days before the annual meeting the secretary shall prepare a ballot, containing in and for each of these districts not less than three names, and for the offices of president, vice-president and secretary, each, not less than three names, which shall be in each case those receiving the largest number of nominating votes before the closing of the polls. This ballot shall be mailed to each member of the Society entitled to vote, who may vote for one councillor in each district, having the right to substitute names not on the list, and to cast not over three votes for a single candidate, provided that the total number of votes cast by such member shall not exceed the total number of vacancies to be filled; and who may cast one vote for president, vice-president and secretary, respectively, having the right to substitute names not on the list. The ballot shall be signed, sealed and voted as prescribed in by-law 16.

12—CANVASSING BALLOTS FOR COUNCILLORS.

At noon of the first day of the annual meeting the polls shall be closed and the ballots counted by two tellers appointed by the president. Councillors shall not be eligible for such appointment. The candidate for councillor in each district, and the candidate for the respective elective offices, receiving the largest number of votes, shall be elected. In case of a tie the president shall cast the deciding vote.

13—MEETINGS OF COUNCIL.

Meetings of the council for the transaction of business may be called at any time by the president, and shall be called at the request in writing of three councillors. Unless for reasons of weight, at least ten days' notice of meetings shall be given. Five councillors, present in person or by proxy, shall constitute a quorum. A letter ballot of the council shall be taken on any question of importance, if so ordered by the presiding officer at any meeting, or at the request in writing of three councillors. Whenever a letter ballot of the council be taken, a majority vote of the council shall be required to pass the motion put to ballot, except that letter ballots upon candidates for admission to membership shall be decided as provided in by-law 1.

14—MEETINGS OF THE SOCIETY.

The council shall provide for regular stated meetings of the society, for the transaction of business, or for the reading or discussion of papers, to be held at such times and places as may best serve the interests of the society. Special meetings of the society, or of any section thereof, for a definite purpose, may be called by the president, or shall be called on a request in writing signed by twenty members. It shall not be in order at a special meeting to transact other business than that stated in the call for the meeting. Except for reasons of weight, at least thirty days' notice shall be given of all meetings. Except at annual meetings, ten members present in person or by proxy shall constitute a quorum. Resolutions endorsing or condemning matters of public or professional interest shall take such course as may be prescribed by the council in duly formulated rules, but such rules must provide that not less than thirty days be allowed for any ballot of the membership of the Society.

15—LOCAL OR PROFESSIONAL SECTIONS.

Local sections, or professional groups of members of the Society, may be organized for social, scientific and professional purposes, in harmony with the constitution and by-laws, and such sections shall have only such powers, and shall act under such rules and regulations, as the council may from time to time approve.

16—SEALED LETTER BALLOTS.

When sealed letter ballots are required by the constitution or by-laws, the envelope to contain the ballot shall be so designed that it can be signed on the outside by the voter for identification, and can afterward be opened by the tellers so as to preserve the secrecy of the ballot. The endorsement may take the form of a proxy, to be voted by the tellers appointed by the president, or by such other person, not a councillor, as the member may designate. The ballots signed and sealed shall be mailed or delivered to the secretary, who shall be responsible for their safe-keeping, and who shall endorse thereon the date and time of receipt and make record of such receipt on a list of members kept for the purpose. Any member shall have the privilege, at any time before the closing of the polls, of substituting another ballot, in which case the original shall be returned to him unopened. After the closing of the polls, the ballots, arranged in alphabetical order, with the check list of members above mentioned, shall be delivered by the secretary to tellers appointed by the president. The tellers shall verify the check list, and

open and mix thoroughly the votes in such manner as to preserve the secrecy of the ballot. The ballots after being counted by the tellers, shall be destroyed, and the report of the tellers shall be the official record of the vote. In case a supplementary ballot shall be ordered for members failing to vote on the first ballot, the members whose votes have been counted shall not be permitted to vote a second time nor to change their original vote. The result of the ballot shall be communicated to the members of the Society at such time and in such manner as the council shall determine.

17—VOTE OF CONFIDENCE.

The council, by a two-fifths vote of its members, or upon request in writing of twenty per cent. of the members of the society, shall submit any question to the membership for a vote of confidence. Such vote must be inaugurated within fifteen days after a motion for a vote of confidence has been passed; and the majority of votes received within thirty days after issuance of the ballot shall decide. In case such question is decided against the council, the members thereof shall forthwith resign office, their resignations to take effect on the election of their successors, and a new election of the whole council shall be immediately ordered to be conducted as provided in the by-laws. The new councillors shall by lot divide themselves into three classes to serve until the next annual meeting and for one and two years thereafter respectively.

18—AMENDMENTS TO BY-LAWS.

Amendments to the by-laws shall take the course provided for amendments to the constitution, save that when the letter ballot is taken a majority of the votes received within thirty days shall pass or defeat such amendments.

RULES AND REGULATIONS

A.—Rules Governing Resolutions.

1. Resolutions upon matters of interest to the Society, or upon matters that it is desired to submit to the entire membership of the Society, other than amendments to the constitution and by-laws, may be introduced at any meeting of any local section. Upon adoption by such section, the secretary of the section shall communicate the resolution as adopted to the secretary of the Society, who shall promptly lay it before the council. The council, after consideration of such resolution, shall (1) submit it to the membership of the Society for vote by letter-ballot as provided in the by-laws; or (2) make such amendment as in the opinion of the council is desirable, without, however, altering the intention of the resolution, and then shall submit it to vote by the Society; or (3) reject the resolution and return it to the section that communicated it, with the reason for rejection.

2. A local section when notified by the council of the rejection of a resolution may reiterate that resolution; and upon receipt by the council of report of such action, the council shall then promptly submit the resolution to the membership of the Society, without amendment, but the council may accompany the resolution with a memorandum respecting its own action in the case.

3. If the council receives resolutions bearing upon the same subject from two or more local sections, the council shall select for submission to the Society that which in its opinion is the most adequate for the purpose intended; or the council may frame a composite resolution, to which new matter may be added, and shall submit such resolution to the membership of the Society as a resolution proposed by the council in lieu of those adopted by two or more local sections.

4. Any seven members of the Society, not affiliated with any local section, may unite in presenting a resolution to the council, and the council shall act upon such a presentation in the same way as provided under rule 1.

5. The council itself may initiate a resolution and submit it directly to the membership of the Society for letter-ballot.

B.—Rules Governing Local Sections.

1. Local sections of the Society may be formed for promoting social intercourse among members, and for reading papers, and discussing subjects pertinent to the objects of the Society,

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and not inconsistent with the constitution and by-laws of the Society.

2. Such sections may be organized wherever there be 15 members in any city or town, or in places adjacent thereto, upon the request of 10 or more of such members addressed to a councillor, who may thereupon call a meeting of members residing within the limits of the proposed section, and if not less than seven members attend such meeting, they may thereupon organize such section, elect officers, comprising at least a chairman and a secretary, and adopt rules and regulations for their local government, not inconsistent with the constitution and by-laws of the Society; provided that said rules and regulations, or any subsequent amendment thereof, shall forthwith be submitted to the council of the Society, and shall not become effective until approved by the council; and provided, that all members of the Society residing or engaged professionally in the district included by any section shall be invited to become members of said section; and provided that any such member, upon application and upon complying with the rules and regulations of said section, shall be admitted to membership therein; and provided that all expenses incurred by said section, except as noted below, shall be defrayed by said section.

3. The secretary of each local section shall notify the secretary of the Society as to the names of members enrolled in his section and shall promptly inform the secretary of the Society respecting any resignations from or additions to membership. In the event of any dispute as to membership, or the right to enroll members, the matter shall be referred to the council of the Society, whose decision shall be final.

4. The Society will pay, on request, two-thirds of the actual cost of stenographic reports of the meetings of any section, provided that the amount so paid does not exceed one-half the dues paid into the general treasury by the members of such section, nor exceed \$100 in any one year.

5. Dues or assessments for the defrayment of the expenses of local sections shall be levied as each section shall determine, but shall not exceed \$5 per member in any one year. The failure of any member to pay such section-charges shall be reported to the council of the Society and delinquency for more than one year after notice has been served shall be a reason sufficient for the suspension or termination of the membership in the Society of such delinquent member. Any member not in arrears in payment of section-charges may terminate his connection with any section by written notification

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to the secretary thereof. If by resignation, or otherwise, the membership of any local section shall fall below 15, the existence of such section may be terminated by the council.

6. The proceedings of local sections, including papers and discussions, shall be reported to the secretary as hereinafter provided. No section shall, without the approval of the council of the Society, permit any account of its proceedings or of its papers or discussion to be printed in any newspaper or technical publication, nor shall any such section print or publish any proceedings, without the assent and approval of said council, nor issue any printed matter, except the necessary notices, etc., relating to the management of the section. No section shall at any time perform any act or deed which is properly a function of the Society.

7. The geographical limits of each local section shall be subject to such amendment or limitation as the council of the Society may from time to time determine.

8. All members of the Society shall have the right to attend all meetings of all sections.

9. Honorary members of the Society shall be exempt from dues to any local section.

10. The order of business at meetings of local sections shall be :

- a. Reading of minutes of previous meeting.
- b. Transaction of business.
- c. Discussion of professional and technical questions.

11. The proceedings at each meeting of each section shall be promptly reported by the section-secretary to the secretary of the Society.

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LOCAL RULES.

NEW YORK SECTION.

1. The officers of the New York Section of the Mining and Metallurgical Society of America shall be a chairman, a vice-chairman and a secretary, who shall be elected at the first meeting after the summer of each year, and shall hold office for one year from that time. These officers shall constitute the executive committee of the section.

2. The expenses incurred by the section shall be divided equally among all its members, and shall be payable at such times as the executive committee shall name.

3. In the absence of the chairman and vice-chairman, the meeting shall elect a chairman *pro tem*, to serve at that meeting. In the absence of the secretary, the chairman shall appoint an acting secretary to serve for that meeting.

4. The secretary shall keep a record of the proceedings of the meetings, and immediately after each meeting shall forward to the general secretary of the society a report of the proceedings.

5. The presence of seven members of the section at a meeting shall constitute a quorum.

6. Members shall have the privilege of bringing guests to ordinary meetings of the section, but not to meetings previously announced as executive.

PHILADELPHIA SECTION.

1. The officers of the Philadelphia Section of the Mining and Metallurgical Society of America shall be a chairman and a secretary, who shall be elected at the first meeting after the summer of each year, and shall hold office for one year after that time.

2. The expenses incurred by the section shall be equally divided among all members of the section, and shall be payable at such times as the chairman may name.

3. In the absence of the chairman, a meeting shall elect a chairman *pro tem*, to serve at that meeting. In the absence of the secretary, the chairman shall appoint an acting secretary to serve for that meeting.

4. The secretary shall keep a record of the proceedings of the meetings, and immediately after each meeting shall forward to the general secretary of the society a report of the proceedings.

5. The members of the section shall have the privilege of bringing guests to the meetings of the section.

MEMBERS.

January 1, 1912.

- Aldridge, W. H.....603 Central Bldg., Los Angeles, Cal.
Managing Director, Inspiration Copper Company.
- Allen, John H.....82 Beaver St., New York City
Consulting Metallurgist, Knox & Allen.
- Appleby, William R.....Minneapolis, Minn.
Prof. of Metallurgy, State University.
- Argall, Philip.....First National Bank Bldg., Denver, Colo.
Consulting Mining Engineer.
- Arnold, Ralph.....Room 700, H. W. Hellman Bldg., Los Angeles, Cal.
Consulting Geologist and Mining Engineer.
- Austin, L. S.....251 W. 2d North St., Salt Lake City, Utah
Consulting Metallurgist.
- Bain, H. Foster.....420 Market St., San Francisco, Cal.
Editor, *Mining and Scientific Press*.
- Beard, J. T.....505 Pearl St., New York City
Associate Editor, *Coal Age*.
- Beeler, H. C.....1004 First National Bank Bldg., Denver, Colo.
Consulting Mining Engineer.
- Bellinger, Herman C.....Cobar, N. S. W.
Metallurgical Engineer; Gen. Mgr., Great Cobar, Ltd.
- Benjamin, Edward H.....75 Fremont St., San Francisco, Cal.
President, Joshua Hendy Iron Works.
- Boutwell, J. M.....1323 de la Vina St., Santa Barbara, Cal.
Mining Geologist.
- Bradley, F. W.....Crocker Building, San Francisco, Cal.
President, Bunker Hill & Sullivan M. & C. Co.
- Bradley, Philip Read.....35 Wall St., New York City
Consulting Mining Engineer, Exploration Company of New York.
- Branner, J. C.....Stanford University, Cal.
Prof. of Geology, and Vice-President, Stanford University.
- Brayton, Corey C.....701 People's Bank Bldg., Sacramento, Cal.
Asst. Gen. Mgr., Natomas Cons. of Cal.
- Brock, Reginald W.....Ottawa, Canada
Director, Geological Survey of Canada.
- Brooks, A. H.....Washington, D. C.
Geologist, U. S. Geological Survey.
- Brown, R. Gilman.....62 London Wall, London, E. C., England
Consulting Mining Engineer.
- Browne, Ross E.....234 Perry St., Oakland, Cal.
Mining Engineer.
- Buck, Stuart M.....Bramwell, W. Va.
Mining Engineer.
- Buckley, E. R.....1364 Peoples Gas Bldg., Chicago, Ill.
Mining Geologist and Engineer.
- Burch, Albert.....Crocker Bldg., San Francisco, Cal.
Mining Engineer.
- Burgess, John A.....Wonder, Nev.
Supt., Nevada Wonder Min. Co.

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- Butters, Charles.....333 Kearny St., San Francisco, Cal.
Mining Engineer and Metallurgist.
- Caetani, Gelasio.....Crocker Bldg., San Francisco, Cal.
Consulting Mining and Metallurgical Engineer.
- Cairns, F. I.....Houghton, Mich.
Supt., Michigan Smelting Co.
- Cates, Louis Shattuck.....Ray, Ariz.
Supt. of Mines, Ray Consolidated Copper Co.
- Catlin, Robert M.....Franklin Furnace, N. J.
Engineer, New Jersey Zinc Co.
- Chance, H. M.....819 Drexel Bldg., Philadelphia, Pa.
Consulting Mining Engineer and Geologist.
- Channing, J. Parke.....42 Broadway, New York City
Consulting Mining Engineer.
- Chase, Charles A.....921 Equitable Bldg., Denver, Colo.
Consulting Mining Engineer.
- Chase, Edwin E.....932 Equitable Bldg., Denver, Colo.
Mining Engineer.
- Chauvenet, S. H.....Sheridan, Pa.
Manager, Berkshire Iron Works.
- Christy, S. B.....Berkeley, Cal.
Prof. of Mining and Metallurgy, University of California.
- Claghorn, C. R.....Tacoma, Wash.
Gen. Mgr., Northwestern Improvement Co.
- Clark, C. D.....Care U. S. Smelting, Refining & Mining Co., Mammoth, Cal.
Mining Engineer.
- Clark, W. B.....Baltimore, Md.
State Geologist, and Prof., Johns Hopkins University.
- Clements, J. Morgan.....42 Broadway, New York City
Mining Engineer and Geologist.
- Clevenger, G. Howell.....Palo Alto, Cal.
Associate Prof. of Metallurgy, Stanford University.
- Cobb, Collier.....Chapel Hill, N. C.
Prof. of Geology, University of North Carolina.
- Collins, George E.....418 Boston Bldg., Denver, Colo.
Consulting Engineer; Gen. Mgr., Argo Company.
- Comstock, Theodore B.....Room 30, City Hall, Los Angeles, Cal.
Mining Engineer.
- Conner, Eli T.....1134 Real Estate Trust Bldg., Philadelphia, Pa.
Consulting Mining Engineer.
- Corning, Christopher R.....36 Wall St., New York City
Consulting Mining Engineer.
- Cottrell, F. G.....2332 Fulton St., Berkeley, Cal.
Physical Chemist, U. S. Bureau of Mines.
- Cowles, Alfred H.....Sewaren, N. J.
Metallurgist; Pres., Electric Smelting & Aluminum Co.
- Cox, W. Rowland.....165 Broadway, New York City
Mining Engineer.
- Crosby, W. O.....Boston, Mass.
Prof. of Geology, Massachusetts Institute of Technology.
- Crowell, Benedict.....407 Perry-Payne Bldg., Cleveland, O.
Consulting Mining Engineer.

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Darton, N. H.	Washington, D. C.
Geologist, U. S. Bureau of Mines.	
Derby, C. C.	Nevada City, Cal.
Mining Engineer.	
d'Invilliers, E. V.	506 Walnut St., Philadelphia, Pa.
Mining Engineer.	
Dorr, John V. N.	728 Equitable Bldg., Denver, Colo.
Consulting Metallurgical Engineer.	
Douglas, James Stuart.	Douglas, Ariz.
Mine Owner and Banker.	
Drake, Francis.	8 Old Jewry, London, Eng.
Consulting Engineer, Foreign Mines Development Co.	
Drinker, Henry S.	South Bethlehem, Pa.
President, Lehigh University.	
DuBois, H. W.	302 Harrison Bldg., Philadelphia, Pa.
Mining Engineer.	
Dufourcq, E. L.	Produce Exchange Building, New York
Mining Engineer.	
Dumble, E. T.	2003 Main St., Houston, Tex.
Geologist.	
Duncan, Murray M.	Ishpeming, Mich.
Gen. Mgr., Cleveland Cliffs Iron Co.	
Easton, Stanly A.	Kellogg, Idaho
Mining Engineer; Mgr., Bunker Hill & Sullivan M. & C. Co.	
Eurich, Ernst F.	15 William St., New York City
Consulting Mining Engineer.	
Fairchild, S. E., Jr.	530 Land Title Bldg., Philadelphia, Pa.
Mining Engineer.	
Farish, John B.	603 Colorado Bldg., Denver, Colo.
Consulting Mining Engineer.	
Finlay, J. R.	52 William St., New York City
Consulting Mining Engineer.	
Fitch, Walter.	Eureka, Utah
Pres. and Gen. Mgr., Chief Cons. Mining Co., etc.	
Foote, Arthur DeWint.	Grass Valley, Cal.
Mining Engineer.	
Fowler, Samuel S.	Drawer 1024, Nelson, B. C.
Mining Engineer and Metallurgist.	
Fuller, John T.	505 Park St., Honesdale, Pa.
Consulting Mining Engineer.	
Fulton, Charles H.	Cleveland, O.
Prof. of Metallurgy, Case School of Applied Science.	
Garrison, F. Lynwood.	760 Drexel Bldg., Philadelphia, Pa.
Mining Engineer.	
Gemmell, Robert C.	Salt Lake City, Utah
Gen. Supt., Utah Copper Co.	
Goodale, Charles W.	Butte, Mont.
Mgr., Boston & Montana Consolidated C. & S. Mining Co.	
Gottsberger, B. Britton.	Miami, Ariz.
Gen. Mgr., Miami Copper Co.	
Grant, U. S.	Evanston, Ill.
Prof. of Geology, Northwestern University.	

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Haas, Frank.....	Fairmont, W. Va. Consulting Engineer, Consolidation Coal Co.
Halberstadt, Baird.....	Pottsville, Pa. Mining Geologist.
Hartranft, Samuel S.....	Norristown, Pa. Metallurgical Engineer.
Havard, Francis T.....	Madison, Wis. Prof. of Metallurgy, University of Wisconsin.
Hayes, C. Willard.....	Tampico, Tamps, Mex. Gen. Mgr., Exploitation Dept., Cia. Mexicana de Petroleo "El Aguila."
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Hill, Frank A.....	512 S. Centre St., Pottsville, Pa. Mining Engineer.
Hixon, Hiram W.....	251 S. 41st St., Philadelphia, Pa. Metallurgical Engineer.
Hoffmann, Aug. O.....	Polevskoy savod., Mramorskaia, Perm, Russia Mgr., Polevskoy Mines and Reduction Works.
Hofman, H. O.....	Boston, Mass. Prof. of Metallurgy, Mass. Inst. of Technology.
Holden, Edwin C.....	Madison, Wis. Consulting Engineer; Prof. of Mining, University of Wisconsin.
Holmes, Joseph A.....	Washington, D. C. Director, United States Bureau of Mines.
Hoover, Herbert C.....	Red House, Hornton St., London, W. Managing Director, Oroya Brownhill, Etc.
Howe, Ernest.....	77 Rhode Island Ave., Newport, R. I. Geologist.
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Huntoon, Louis D.....	42 Broadway, New York Consulting Mining Engineer.
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Lessner, Charles B.....	Carril, Spain Metallurgist.
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Lindsley, Halstead.....	Silver Centre, Ont. Consulting Mining Engineer.
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Rickard, T. A.....	Salisbury House, London, E. C., England
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Sussman, Otto	52 Broadway, New York City Consulting Mining Engineer.
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Thacher, Arthur	Roe Bldg., St. Louis, Mo. Mining Engineer.
Townsend, Arthur Rodman	25 Broad St., New York City Consulting Mining Engineer.

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Washington, Henry S.....	Singer Bldg., New York City	Mining Geologist.
Waterman, Douglas	Jocoro, Salvador, C. A.	Mgr., Gigante Mining Co.
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Westervelt, William Y.....	17 Madison Sq. E., New York City	Mining Engineer.
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Wheeler, Shelton K.....	R. F. D. No. 2, Box 114, Billings, Mont.	Mining Engineer.
White, Robeson T.....	Rancagua, Chile	Gen. Mgr., Braden Copper Co.
Wiard, Edward S.....	417 Boston Bldg., Denver, Colo.	Mining Engineer.
Williams, Gardner Fred.....	2201 R St., Washington, D. C.	Consulting Mining Engineer.
Wilmot, H. C.....	Rye Valley, Ore.	Mgr., Commercial Mining Co.
Wilson, William A.....	Salt Lake City, Utah	Consulting Mining Engineer.
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Winchell, H. V.....	505 Palace Bldg., Minneapolis, Minn.	Geologist.
Wright, Louis A.....	42 Broadway, New York City	Consulting Mining Engineer.
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Young, George J.....	737 Center St., Reno, Nev.	Prof. of Mining and Metallurgy, Mackay School of Mines, University of Nevada.
Total Members.....		229

DECEASED MEMBERS.

Bettles, Alfred J.....	Died Aug. 3, 1911
Blake, William P.....	Died May 22, 1910
Carpenter, Franklin R.....	Died April 1, 1910
Dudley, Charles B.....	Died Dec. 21, 1909
Emmons, Samuel Franklin.....	Died Mar. 28, 1911
Forrester, Robert.....	Died Dec. 20, 1910
Shelby, Charles F.....	Died Jan. 25, 1911
Sutton, Linton B.....	Died June 11, 1911
Thompson, Heber S.....	Died Mar. 9, 1911

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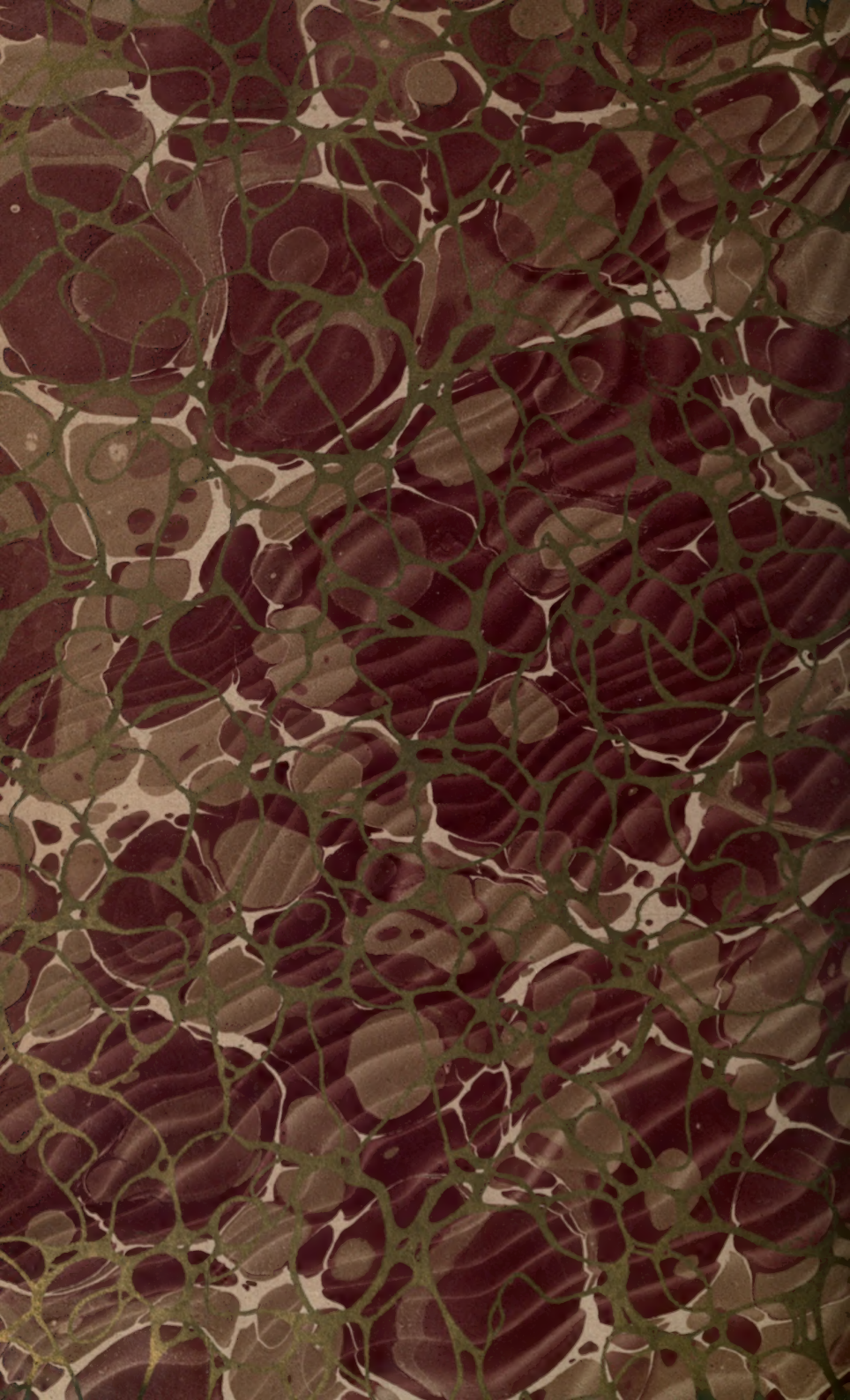
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